

Railway Age Gazette

PUBLISHED EVERY FRIDAY AND DAILY EIGHT TIMES IN JUNE BY THE
SIMMONS-BOARDMAN PUBLISHING COMPANY
WOOLWORTH BUILDING, NEW YORK

CHICAGO: Transportation Bldg. CLEVELAND: Citizens' Bldg.
LONDON: Queen Anne's Chambers, Westminster.

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Subscriptions, including 52 regular weekly issues and special daily editions published from time to time in New York, or in places other than New York, payable in advance and postage free:

United States and Mexico.....\$5.00
Canada 6.00
Foreign Countries (excepting daily editions)..... 8.00
Single Copies.....15 cents each

Engineering and Maintenance of Way Edition and four Maintenance of Way Convention daily issues, North America, \$1; foreign, \$2.

Entered at the Post Office at New York, N. Y., as mail matter of the second class.

WE GUARANTEE, that of this issue 8,900 copies were printed; that of these 8,900 copies 7,431 were mailed to regular paid subscribers to the weekly edition, 250 were provided for counter and news companies' sales, 1,112 were mailed to advertisers, exchanges and correspondents, and 104 were provided for samples and office use; that the total copies printed this year to date were 346,350, an average of 9,361 copies a week.

VOLUME 57

SEPTEMBER 11, 1914

NUMBER 11

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*Illustrated.

Why should the appeal of the railroads to President Wilson deserve a different consideration than that of the cotton industry

President Wilson
and the
Railroad Situation

or any other great industry desperately hard hit by the war? The magnitude of the property involved, the extreme urgency of the emergency both entitle the railroads' case to the President's consideration, but not necessarily on these accounts alone to a different kind of consideration than that given to other hard hit businesses. The President having shown himself a strong man, undisputed leader of his party and a director of the course of the country, is in the present crisis beset with many and moving

appeals for help. But no government can shoulder the burdens and misfortunes of private business. Why then should the railroads ask special consideration? Precisely because the railroads are not a private business. This fact railroad presidents of twenty years ago were loath to unreservedly acknowledge. Since then the fact has been pounded home by legislators, by agitators, by courts and by overwhelming public opinion. There can be no investor so blind to conditions as to have any doubts that when he buys railroad securities the property he invests in is subject to public regulation. This distinction between the railroads' case and that of other businesses that have appealed to the government for some measure of relief is vital and fundamental. The public have heretofore been mainly impressed with only one side of this fact. Now every consideration of justice and integrity require the consideration of the other side of the same fact. The railroads' appeal is a modest one, the facts are momentous. The loss in 1914 in net operating income was \$120,000,000. No government guarantee of railroad securities is asked. The President is simply requested to urge on the people that no further immediate burdens be placed on the railroads, and on the "appropriate governmental agencies" that they seek a way by which additional revenue may be promptly raised. The granting of these two requests would mean the recognition of the government's obligations, as well as its prerogatives in the regulation of private capital engaged in public service. Its effect on the credit of the railroads would be incalculably great.

Railroads, speaking generally, have a reputation for punctuality.

This reputation dates from the time, 60 to 80 years ago, when railroad trains were compared with stage coaches. A correspondent, in another column, avers that today, in this respect, many prominent roads deserve execration rather than praise. How many there are

Unpunctuality as Affecting Reputation

to which our correspondent's criticisms and admonition may apply we do not know; but every one must agree that his position is sound. A passenger's loss of three minutes may not produce a grievance that ever will be felt by the general manager; but the superintendent who prevents those three-minute delays will have greatly improved the general discipline of his forces; for only good men can perform the satisfactory service which the best punctuality implies. Any engineman (or conductor, or station master) who is not alive to the arts involved in being punctual can learn them any day, by a visit to the New York subway, where time-intervals of 96 seconds are quite regularly adhered to; and the schedules are maintained too. Why not send some of your men on such a visit? Premiums to enginemen for punctuality could be made very useful and profitable, at least temporarily. Again, on many runs, a satisfactory degree of punctuality, once accomplished, would suggest a saving by the use of lighter engines. How many thousands of tons do we haul over the road daily, in the shape of monster locomotives, far too heavy for their loads, simply to be able to make up lost time? Punctuality is a fascinating study in many directions.

In connection with the efforts of the railways to carry out the suggestions recently made by the Interstate Commerce Commission

Charging for Free Service

in the direction of increasing passenger fares and charging for incidental services now rendered free in freight traffic, a suggestion has been made that the railways impose a charge for handling baggage. European roads generally charge for handling baggage in excess of a very small amount, and while the adoption of such a plan in this country would undoubtedly raise a storm of protest, there are many reasons why a difference should be made in the charges paid by those for whom the railroad checks baggage and those for whom it does not. Certainly the idea is consistent with the gradual tendency of the com-

mission toward the cost of service basis of rate-making. The equipment and labor necessary to handle baggage both at terminals and in transit cost money, and passengers for whom the roads provide transportation and care for 150 pounds of personal property receive an appreciably greater service than those for whom it does not handle baggage. The usual charge for checking a parcel at stations for 24 hours is 10 cents. This service is far less valuable to the patron and costs less to render than the handling and transportation of baggage, yet the man who cares for his own hand baggage en route, but checks it at a parcel room at either end of his journey, pays more than the man who asks the railway to handle his 150-pound trunk. Whether the charge should be a fraction of a cent per mile for each 100 or 150 pounds, or a certain percentage of the ticket rate, is a matter of detail. Excess baggage rates are based on the latter plan, and under the prevailing mileage system of passenger fares both come to about the same. Even a flat charge of 10 cents, regardless of distance, would yield a considerable income in the course of a year. This suggestion should, but probably will not, appeal to the very numerous class of people who are fond of pointing out examples of railroad discrimination in favor of the other fellow.

It looks as if the great European war were going to open up an unusual opportunity for the railway supply manufacturers of

Opportunity for American Supply Concerns

the United States. The railways of a country tend to purchase equipment and supplies in the same countries in which they are financed. This is by no means an invariable rule, but is what usually is done. For example, most of the capital invested in the railways of Argentina has come from England, the roads have been built chiefly by Englishmen, and most of their equipment and supplies have been bought in England. The railways of Australia, while most of them are owned by the governments, have been built by men of English birth or descent with capital raised in England, and they likewise have bought in England most of the equipment and supplies which have not been made in Australia itself. Largely because of the fact that relatively few of the railways of foreign countries have been financed by American capital the railway supply concerns of the United States have had great difficulty in winning foreign markets. The war, however, has largely stopped the exportation of railway supplies and equipment from most of the countries on the continent of Europe, and has most seriously interfered with their manufacture and shipment from Great Britain. This should broaden the market of the railway supply concerns of America in all parts of the world outside of Europe. As long as the war continues there will be more destruction of railways in Europe than building or equipping of them, but when the war is over Europe's demands for railway supplies to be used in reconstructing and re-equipping the lines that are now being allowed to deteriorate or which are actually being destroyed will be something enormous. Of course, the one large market to which the railways of Europe can turn will be that of America. While, therefore, the war may have temporarily injured the railway supply business of this country, it would seem that it will not be long until it will begin to help it, and that in the long run it will help it a great deal.

Professor William Z. Ripley, of Harvard University, has a very interesting article in the current number of *The American Economic Review* discussing public regulation of railroad securities, in which he comes to the conclusion that the power to compel publicity alone, as recommended by the Hadley Securities Commission, is not enough authority to give the Interstate Commerce Commission over the issuance of railroad securities to prevent interference by state authorities. It must be remembered that the decisions in the Minnesota and Shreveport cases

had not been rendered by the Supreme Court when the report of the Hadley commission was made, and it is quite possible that a majority of the Hadley commission would now agree with Professor Ripley. The report of the commission made it plain that the majority did not believe that conflicting state regulation was desirable, and that it did believe that its elimination by the assumption of authority by a federal body was desirable. On the other hand, Professor Ripley apparently believes that a great deal of good has resulted from state regulation, and cites the work of the New York and Texas commissions as examples of the successful prevention of overcapitalization. He fails to mention, however, that one of the earliest decisions rendered by the New York commission was one in which it gave permission to the Delaware & Eastern to issue \$2,050,000 stock and \$4,570,000 5 per cent bonds at not less than 80. That was early in 1909. In the latter part of February, 1910, the company was put into the hands of a receiver, and on March 2 *The Wall Street Journal* had the following to say in regard to the affairs of the company:

Receivers for the Delaware & Eastern are at work on the company's books in an effort to straighten them out sufficiently to enable the bondholders to see just what sort of situation they confront. As matters stand the exact amount of the railway company's liabilities is unknown, and its assets appear to consist of little more than a lease of the Delaware & Eastern Railroad Company, an agreement with a foreign underwriting syndicate, and a heap of overdue and unpaid bills.

This is a rather glaring instance of the failure of public regulation of the issuance of securities to protect the investor, and it is worth while recalling just at present when the federal bill for the regulation of securities is under discussion.

DIVISION OF MAINTENANCE OF WAY EXPENSES BETWEEN PASSENGER AND FREIGHT TRAFFIC

DURING the past two years there has developed a very marked tendency on the part of regulating bodies to demand the division of railway expenses between freight and passenger service. The methods adopted by the Pennsylvania Railroad and by the Oklahoma Commission, and those tentatively outlined by the Interstate Commerce Commission, were reviewed in our issue of July 24, page 153. Among the most difficult classes of expenses to distribute accurately between passenger and freight traffic are those incurred in the maintenance of way and structures. While the division of these charges is an accounting problem, the accountants must depend upon the maintenance of way department for their basic data and, therefore, the problem becomes primarily one for the maintenance of way department.

It is necessary to assume some unit as a basis for the distribution of charges, and it is here that the great difficulty arises. Various units have been proposed which differ according to the degree of refinement desired. The most common one is the revenue train mile, which is the unit adopted by the Pennsylvania and very generally by other roads in the distribution of charges for the maintenance of joint tracks. The advantage of this unit is its simplicity. But, it is inaccurate in that it assumes that all trains cause equal damage to the track and structures and ignores all the effects of tonnage and speed. A light two-coach passenger train is assumed to cause as much damage to track as a 4,000-ton freight train or a high speed passenger train with 10 or 12 heavy cars. To eliminate these causes of error the "train speed ton mile" was proposed in Oklahoma, although it was not adopted finally. This unit equates for the greater wear on the track and structures resulting from the operation and high speed passenger trains and heavy freight trains. But it also is subject to criticism because, while it is known that a locomotive is more destructive to the track than an equivalent weight of cars, the scheme of division in question does not allow for this. The relative allowance which should be made for a locomotive is a point on which there is a wide diversity of opinion. Some authorities have estimated that a locomotive is five times as destructive as cars having the same

weight. The committee on Economics of Railway Location of the American Railway Engineering Association concluded a year ago that a locomotive does twice as much damage per ton of weight as the rest of the train, while a passenger train is twice as destructive as a freight train of the same weight. While this conclusion was not formally adopted by the association, it is supported by results taken recently from the records of some roads. While the use of this unit, called "the equivalent ton mile" requires the collection of considerable data and statistics, it is probably nearer correct than any of the others favored.

Unfortunately, very little accurate information throwing light on this general question has been collected. There is, however, a rapidly increasing need for it. When it has been secured many points that are now doubtful will be cleared up, and the expenses which must be divided arbitrarily between freight and passenger traffic will be reduced to a small proportion of the total. Now that the railroads are beginning to face this problem squarely its solution will be found.

RESULTS OF MUNICIPAL OWNERSHIP

SOME interesting figures bearing on the question of government ownership of public utilities are given in a bulletin on central electric light and power stations for 1912, just issued by the Bureau of the Census. The figures include comparisons of the operations of municipal and commercial plants. The bulletin shows that during the 10-year period, 1902-1912, the total number of stations increased from 3,620 to 5,221, or 44.2 per cent, and that while the number of commercial stations increased from 2,805 to 3,659 or 30.4 per cent, the number of municipal stations increased from 815 to 1,562 or 91.7 per cent.

Municipal ownership of these utilities seems to have become rather popular. If this popularity has been justified by an increase in efficiency or by improved service it would be expected that this would be shown in the figures for income, output and expenses. But during this 10-year period the total income of commercial stations increased 254.2 per cent, and of municipal stations 233.4 per cent; the output of commercial stations in kilowatt-hours increased 375.8 per cent, and of municipal stations 174.4 per cent; and the total expenses of commercial plants increased 246.1 per cent, while the increase in municipal plants was 222.5 per cent. In other words, with three times the percentage of increase in numbers the municipal plants increased both their income and their output in less proportion than the commercial plants and had an increase of 222 per cent in expenses to produce an increase of 174 per cent in output, while the commercial stations, with only a slightly greater increase in expenses, obtained over twice the increase in output.

This is not the kind of efficiency that is promised by advocates of government ownership. Reduced to units of output the expense of producing electricity in municipal plants in 1912 was 3.15 cents per kilowatt-hour, while that in commercial plants was only 1.96 cents. On the other hand, the total income of municipal stations grew faster than either their expenses or their output, while the commercial plants had a gain of 254 per cent in income to pay for a 375 per cent increase in output, which enhanced their expenses by 246 per cent. This would indicate that the commercial stations had their rates reduced, but that the municipal stations not only were more successful in maintaining their rates than the commercial stations, but were more successful in making rates high than in increasing production or controlling expenditures.

The bulletin does not give statistics showing the rates charged for service, but by dividing the total income by the number of kilowatt hours of output we obtain an average rate of 2.5 cents for the commercial stations and 4.3 cents for the municipal stations. The rate of the commercial companies had been reduced from 3.4 cents in 1902, while that of the municipal plants had been increased from 3.5 cents.

Figures are not given separately in the bulletin for the wages and salaries paid, but it is significant that the number of persons employed in municipal plants is shown as 10 per cent of the total for both classes of stations, while the kilowatt capacity of their

dynamos was 7.2 per cent, and their actual output was 4.7 per cent of the total. The total number of persons employed in municipal plants increased 132.4 per cent in 10 years, to produce an increase of 174.4 per cent in output. In the commercial plants an increase of 165.3 per cent in the number of persons employed produced an increase of 375 per cent in output. The commercial stations also were more successful in obtaining the greatest efficiency from their plants, the kilowatt capacity of their dynamos increasing 333.7 per cent for an increase of output of 375 per cent, while in the municipal plants the kilowatt capacity of dynamos increased 225.2 per cent for an increase of output of 174.4.

Of course, central electric stations are not railroads and municipalities are not the same as the federal government, but it is noteworthy that the more the results of government activities are studied, whether in relation to their own finances or to the operation by them of the postoffice, railways, telegraph, telephone, or other utilities, the more glaring becomes the showing made of the inefficiency of political management as applied to business.

NEW BOOKS

Proceedings of the Sixth Annual Convention of the International Railway Fuel Association. 342 pages, 41 illustrations, 6 in. by 9 in. Bound in morocco. Published by the Association, 922 McCormick building, Chicago. Price \$1; paper binding, 50 cents.

This book contains a complete record of the proceedings of the convention of the International Railway Fuel Association which was held at Chicago, May 18 to 21, 1914. Committee reports and papers were presented and discussed relative to many phases of the railway fuel problem. To those who are interested in the efficient storage and handling of coal and the various conditions affecting combustion, this book will be of value; it contains much that is authoritative on these subjects.

Traffic Glossary. By R. D. Riley, instructor in Interstate Commerce, La Salle Extension University, Chicago. 136 pages, 6 in. by 9 in. Bound in paper. Published by the La Salle Extension University, 2550 Michigan avenue, Chicago. Price \$1 postpaid.

This book has been prepared especially for the use of students of the course in Interstate Commerce and Railway Traffic of the La Salle Extension University, and is devoted to definitions of traffic territory and technical traffic terms. It is divided into four sections. Section A comprising the larger part of the book, defines territorial traffic terms. These are subject to changes from time to time to meet the various changes in traffic requirements and section A will gradually become obsolete. For the benefit of the readers who desire to keep in touch with these changes a list of territorial directories and freight association publications is given. Section B defines technical traffic terms, section C contains a list of abbreviations frequently used in traffic publications and section D is devoted to the application of classifications both to intrastate and interterritorial traffic.

Brass Furnace Practice in the United States. By H. W. Gillett. 287 pages, illustrated, 5 3/4 in. by 9 in. Bound in paper. Published as bulletin No. 73 of the Department of the Interior, Bureau of Mines, Washington, D. C.

This bulletin is issued as a contribution to the increase of safety and efficiency in the preparation and utilization of the mineral resources of the United States. The object of the investigation of brass furnace practice was to find out the melting and fuel losses in brass melting as practiced at present and to indicate as far as possible the methods by which the losses may be reduced. The investigation deals with the general types of furnaces in use and gives the result of the investigation in detail. General factors affecting the operation of brass furnaces are carefully considered and considerable space is devoted to remarks on furnace types and parts. Possible improvements in furnaces and accessories are discussed as well as some furnace problems which are awaiting solution. The latter part of the book is devoted to causes of disease and danger and essentials for health and safety.

Letters to the Editor

THE LATE STARTING OF PASSENGER TRAINS

NEW YORK, August 20, 1914.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

In casting about for ways and means to please the public some railway officers could well afford to devote more attention to the matter of getting trains away from terminals on time. There are roads on which it is a chronic condition for trains to leave terminal stations from two to five minutes late, almost entirely because of waiting for late passengers and late baggage. Of course there is the argument that no one need worry as long as the train arrives on time, no matter how late it is in leaving; but in a great many cases the few minutes late in leaving are never made up. And then, again, what about the passengers who get off at a local station before there is any opportunity to make up time? They are as much entitled to schedule time service as those who go the full length of a division.

Passengers are largely to blame for this condition; they adopt an "Oh, the trains are always late anyway" attitude, and get into a habit of arriving at the station at the last minute, or later. But, after all, the railways are responsible for this attitude on the part of the traveling public. If they had made a reputation for getting trains away on time instead of late, a much greater percentage of the passengers would be on hand at leaving time. There will, of course, always be some stragglers who will complain about being left, but if the trains leave on time the majority will be on hand to leave with them, and will adopt a different attitude toward the road and its service.

Some years ago a western road achieved such an unenviable reputation for late trains that the vice-president issued a circular to all concerned in train operation, calling upon them to co-operate in every possible way to bring about an improvement. A great deal may be accomplished by the prompt closing of doors and giving of signals by trainmen, and by engineers being ready to receive a signal and act on it immediately. Particularly in suburban service, where schedules are often so exacting that a two-minute or a three-minute delay in starting is never regained, there should be close co-operation among the members of the crew. On a certain road which does a large suburban business, a considerable proportion of the trains are almost always two or three minutes late in starting, and in most cases this time is never made up, the trains falling back on the time of following trains and causing additional delays. Holding the gates open in terminal stations until the leaving time of a train, of course makes it impossible for the train to get away on time. In some of the large stations with their magnificent distances that must be traveled after the gates are passed, the situation is more complicated, but it should surely be possible to arrive at a solution even here. There is no reason why a road should not have a reputation for starting trains on time. If trains start on time they are more likely to arrive on time, and the officers of a road that has such a reputation will not need to worry much if some of their competitors have a little nicer cars.

L. C. N.

BASIS OF REASONABLENESS OF COMPETITIVE RATES

ANN ARBOR, Mich., July 10, 1914.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

The discussion of "Economic Theory and Railway Rate Regulation," by Mr. Hand in the *Railway Age Gazette* of February 27 has suggested to me one interesting problem—namely, the basis of the reasonableness of a competitive rate. Mr. Hand has shown that there are today many cases of competition—competition of localities, facilities and markets.

The organization of our commercial and industrial enterprises is influenced to a considerable extent by the construction of our competitive rates. The relative rates on wheat and flour, for instance, from the Kansas wheat fields to California, has a direct influence upon the location of flour mills. Since flour made from California wheat must be mixed with the durum wheat of Kansas, the margin between the rates on wheat and flour from Kansas will determine where the mill had best be located. When the carriers increased the rate on flour from \$.65 to \$.75, and kept the rate on wheat at \$.58, the Kansas millers complained to the Interstate Commerce Commission (29 I. C. C. R., 459). This is one of the many examples of the competitive rate problems. The decision in this case was that no proof had been made that the increase was justifiable. There was no reason why the California miller be put upon a parity with the Kansas miller to the detriment of the latter. The course was open to the railroads to reduce the rate on wheat rather than to increase the rate on flour in order to equalize the difference.

As Mr. Hand suggests, such a readjustment of rates would not mean extra traffic for the railroads involved, and so, from the point of view of profit for the carrier such an increase is not justifiable. Let us consider, on the other hand, a case where a railroad has reduced its rates upon competitive traffic to that point, which, in the estimation of the traffic manager, affords the greatest net return, allowing a free movement of the commodity—but, after a period of years, the competitive situation which necessitated the low rate has become less acute, or perhaps has entirely ceased to exist.

My desire, therefore, is to discuss what factors a commission should consider in determining the reasonableness of a competitive rate which has been increased by a railroad for the purpose of securing a greater return from the traffic involved. This question is complicated with the problem of a railroad absorbing part of the prosperity of an industry; its analysis also will throw light upon such issues as the present advance in rates case, the reasonableness of the schedule as a whole, and "specific cost for the specific service."

The increase in the rate on fir, hemlock and spruce from the Pacific coast to St. Paul and common points directly presents the issue. (14 I. C. C. R., 1.) In order to utilize an empty car movement eastward, the western roads in 1893 established low rates on lumber moving to the central west. By 1907 the empty car movement, due, in part at least, to the lumber industry, which had grown to enormous proportions, became westward. At this time the carriers raised the rate from \$.40 to \$.50. There were many rates on lumber involved, but for illustrative purposes one will suffice. The problem for the railroads was to justify this increase of a rate which, when first established, was admittedly low.

The question is pertinent: what was the effect of this increase? Did it mean that southern and northern lumber producing areas would encroach upon the market of the Pacific coast? Did it mean that those lumber concerns which operated upon the margin, under the least favorable circumstances, suffered, although, as a whole, the lumber industry continued to be prosperous? An analysis of these questions will throw light upon the theory of competitive rate structure.

On economic grounds, this increase was due to the great prosperity of the business; the carriers realized that they were not receiving all that the traffic could bear. The original low rate was justifiable because some return was made over and above actual haulage cost, thereby reducing the burden of the constant charges upon the non-competitive rates. As long as that competition exists, and the rates are adjusted with reference to that competition, should a railroad be allowed to construct its rate so as to secure the maximum return from the commodity? If the competition of the southern lumber regions in this central territory should suddenly cease, the cause of the original low rate on Pacific coast lumber would no longer exist. If that competition continues, but not to so great an extent, the prob-

lem for the western railroads is to organize their rates with the view of obtaining the largest possible return.

It is a problem of broad public policy to what extent a railroad must equalize economic factors. If an increase in rates, in addition to decreasing profits for some concerns, forces others into insolvency, that rate increase is bound to be opposed. If, however, we argue upon the hypothesis that the sole justification of the rate when first made was to allow an industry to enter a competitive market, that industry cannot with justice demand a maintenance of this low rate whenever that competition ceases. If, on the other hand, there enters a new and more acute competition, the shippers will request their railroad to reduce rates so that they may continue in that market. The traffic manager must then determine at what point in the readjustment of the rate, the railroad will secure the maximum return. The railroad will not be compelled to establish a rate so low that the concern which existed "on the margin" under the former may continue to earn a profit with the lower rate which the exigencies of competition necessitated. In this case, however, the competition did not continue to remain acute, and the railroad felt it could secure a greater return from the traffic by an increase in the rate. Such an increase, therefore, ipso facto, is justifiable, although all the concerns served by that rate may not continue to enjoy prosperity.

The construction of rate schedules upon this basis of the prosperity of the industry concerned is open to the criticism that the gains of good management in that industry, as well as the advantages accruing to an industry because of its excellent location, would thus be shared with the railroad. In answer to that it is well to remember that no rate can be increased above the point at which the principles of classification are operative. We realize that lumber should not be rated as high as sixth class, but the principles underlying the basis of classification applied to lumber would determine the upper level of the lumber rate.

The success of an industry depends in part at least upon its market. If now a market which is not naturally tributary to that producing area is opened to that producing area by reason of a low rate, is it justifiable that such a low rate continue when the competitive forces which caused its inception have ceased? It is fair that a railroad share in the prosperity which it has occasioned, not only through the increased tonnage, but also by an increased rate, and what is more important, it is right that whenever a railroad requests an increase in its non-competitive rates, that railroad can claim, that from its competitive rate structure, it is securing a maximum return.

The advance in rates case involves to some extent such a situation. I do not claim that this theory is particularly applicable when the rate schedules of many carriers in a large district are at issue. To some extent such a readjustment would mean that certain carriers would secure a larger tonnage of competitive traffic. I do offer the suggestion, however, that not only with industrial tracks are the large industries securing revenue due to the railroads, but also that these companies are not paying as high a rate upon the competitive business as the railroads may, with justice, exact.

It is also a question of considerable importance whether such competition would result in severe rate wars. From the point of view of the public, a repetition of the rate wars of the eighties is highly undesirable. If such competition is indirect in its influence, we have little to fear from fluctuating rates, and cut-throat tactics. But such a situation must be recognized in the adjustment of the organization of our commercial and industrial resources.

The theory of the reasonableness of the competitive rates, furthermore, has considerable importance in the question of the reasonableness of the schedule as a whole. There has been, of late, discussion as to the results of a physical valuation upon the structure of our rates; it is claimed that all the railroads are not operating under the same conditions so that what would be a living rate for some carriers would mean insolvency for

others. In order to earn a fair return, a road with severe grades must have higher rates than a water-level line, and competition will force the road with severe grades to meet the rates of the more favorably located company. Is there not, however, a tendency to exaggerate this factor? As a matter of fact, railroads do not compete at each and every point along the line. Some rates are necessarily non-competitive so that, on a line of heavy grades the class rate structure, on which the burden of the constant charges naturally falls, will be relatively high.

Similarly, a road which enjoys a regular heavy tonnage, as is the case with the Pittsburgh & Lake Erie, will establish a lower class rate than a road which serves a large passenger traffic must maintain, because the passenger business is not only in competition with interurban electric lines, but also because of the sociological necessity of a wide distribution of workers from a large city.

It is, in addition, important for a traffic manager to know what is the lowest point at which he can place a rate upon a commodity when requested by a shipper, that that article may enter a competitive market. The traffic manager knows that every increase in the volume of the business does not, within reasonable limits, incur a proportionate increase in the cost of haulage. We see, therefore, that some cost figures must be ascertained in order to determine this lowest possible level for a competitive rate.

The Interstate Commerce Commission in 22 I. C. C. R., 623, considered the reasonableness of an advance in rates on coal from the West Virginia fields to the lakes.

Is a rate unreasonable because it does not pay its full share of taxes, fixed charges and dividends? At the end this is the question to which we come in this case. The carriers themselves having fixed these rates under the mandate of the law that they shall fix just and reasonable rates, have they justified higher rates by showing that the existing rates which they had fixed fall somewhat short of meeting all the related expenses which the carrier must bear, not only for transportation, but to secure an adequate return upon its property? Let us see where this doctrine would lead. If a carrier may raise all rates to a basis where each rate will bear its share of the cost, including all costs, and no lower rate is reasonable, then it must follow that all rates are unreasonable which yield to the carrier a greater return than such cost. Under such theory what would be the rate on tea or silks, or high-priced horses, or delicate machines? . . . In all classifications consideration must be given to what may be termed public policy, the advantage to the community of having some kinds of freight carried at a less rate than other kinds. And this is the true meaning of the phrase "what the traffic will bear." It expresses the consideration that must be shown by the traffic manager to the need of the people for certain commodities. . . . We may not say that a rate shall be fixed so as to meet the requirements or needs of any body of shippers in their efforts to reach a given market, nor may we establish rates upon any articles so low that they will not return out-of-pocket costs. . . . There is, however, a zone within which we may properly exercise "the flexible limit of judgment which belongs to the power to fix rates." . . . A just and reasonable rate must be one which respects alike the carriers' deserts and the character of the traffic. It cannot be a rate which takes from the carrier a profit and thus favors a shipper at the carrier's expense, nor is it one which compels the shipper to yield for the transportation given a sum disproportionate either to the service given by the carrier or the service rendered to the shipper. The words "just and reasonable" imply the application of good judgment and fairness, of common sense and a sense of justice to a given condition of facts.

We realize that the economic basis of the existence of this zone in which to exercise the flexible limit of judgment is the law of increasing returns. We would like to know, on the other hand, what principles should guide judgment in ascertaining whether the rate in a competitive situation is disproportionate either to the service given by the carrier or the service rendered to the shipper. It is our function to measure the value of a transportation service given to one commodity that it may reach a certain market. We must analyze the factors of that service, and it is our firm conviction that the margin of profit for the shipper and the nature and intensity of the competition, so that the railroad may receive the greatest possible return upon the traffic involved, are factors of considerable importance.

BRADSHAW LANGMAID,
University of Michigan.

CONFERENCE BETWEEN THE PRESIDENT AND RAILROAD EXECUTIVES

On Wednesday of this week a committee of railroad executives held a conference with President Wilson. The committee was made up of Frank Trumbull, chairman, Chesapeake & Ohio and Missouri, Kansas & Texas; Samuel Rea, president, Pennsylvania Railroad; Daniel Willard, president, Baltimore & Ohio; Fairfax Harrison, president, Southern Railway; E. P. Ripley, president, Atchison, Topeka & Santa Fe; Hale Holden, president, Chicago, Burlington & Quincy.

The following statement was presented by the committee to the President:

The purpose of this conference is to lay before the President in brief terms the present situation of the railroads of the United States—250,000 miles of great national highways. That the case of the railroads deserves sympathetic treatment arises from the fact that, although privately owned, their property is devoted to public service. The industrial health of the country depends upon an adequate railroad service; such service cannot be rendered and proper response to public needs cannot be made, unless the financial soundness of the railroads is maintained.

The credit of the railroads, seriously impaired as we believe, before the war started, is now confronted by an emergency of a magnitude without parallel in history. To understand the full import of the existing crisis, it is necessary to consider briefly the antecedent conditions.

The purpose here is not to complain but to point out the one paramount fact that by reason of legislation and regulation by the federal government and the 48 states, acting independently of each other, as well as through the action of a strong public opinion, railroad expenses in recent years have vastly increased. No criticism is here made of the general theory of governmental regulation, but, on the other hand, no ingenuity can relieve the carriers of the burden of expense created thereby. However desirable may have been the expenditures which have been forced upon the railroads, no adequate provision has been made to pay the bill.

This great increase in expenses now coincides with seriously depleted revenues, with no corresponding ability of the railroads to reduce their costs in proportion. Governments can proceed with expenditures of all kinds by taxation, but railroads cannot. While the effect of the European war upon railroad earnings may vary in different sections, it is painfully evident that there will be serious decreases in the total because of the unprecedented difficulties in the marketing of cotton, the great decrease in imports, and the general dislocation of trade and industry.

Even prior to the existing emergency and to meet the antecedent situation, railroad expenditures generally had been reduced to absolute necessities. The difficulty of further contraction is enhanced by existing wage agreements, and, in so far as the western railroads are concerned, by the possibilities involved in the arbitration proceedings to which they have recently agreed.

The net operating income of the railroads of the United States for the year ending June 30, 1914, was \$120,000,000 less than for the previous year, or about 15 per cent. The gross earnings for the year were \$44,000,000 less than for 1913—expenses and taxes were \$76,000,000 more.

The maintenance of the credit of the railroads (and the credit of the railroads establishes the standard for all industrial enterprises) depends upon their ability to increase their net earnings. The railroads may have the most perfectly appointed plants in the world, but if the net earnings are not adequate, new capital cannot be attracted.

In the important eastern rate case, the Interstate Commerce Commission unanimously found that the railroads in the richest section of the country needed more revenue. That finding was based upon the situation prior to the first of July, this year; indeed upon conditions of a year previous.

No emphasis need at this time be put upon the new railroad

capital which has heretofore been required to provide for normal development, but this has been from \$400,000,000 to \$500,000,000 per annum, and railroads should not only be able to keep abreast of the times, but should even in this emergency be in a position to anticipate the demands of an expanding commerce.

Simultaneously with the great impairment of earnings, general credit conditions have broken down, and the absolute and immediate necessities of both public and private borrowers of money here and abroad have already increased interest rates to a level unthought of a few months ago—rates much higher than present net earnings return upon the railroad property of the United States.

This emergency was not contemplated when the Interstate Commerce Commission rendered its decision in the eastern rate case, yet the problems now confronting the railroads greatly transcend the seriousness of those which existed then. The menace is now not only to railroad credit but to the transportation service itself, and efficient transportation is inseparably connected with the welfare of our people.

Securities of United States railroads held abroad are computed at from three to five billion dollars. It is a certainty that bond and note obligations of the railroads maturing before the end of next year aggregate over \$520,000,000. In the highest public interest, it is imperative that these obligations shall be met. Yet it is evident that for a long time Europe will not be a lender of money to America. On the contrary, the war will create such enormous debts and involve such a general dislocation of industry and commerce, that Europe must realize largely on its holdings of American securities regardless of the price obtainable.

The New York Stock Exchange has now been closed for a longer period than at any other time in its history. There is no present market for railroad securities, either old or new. The United States is in a condition of financial isolation. If the Stock Exchange were to open (and it must open some time), the pressure of selling would inevitably be greatest against railroad securities. If they go down, industrial issues will fall still more seriously. The public necessity to stem this tide of selling and to reduce to the utmost its destructive effect, is one that calls for the exercise of every resource of statesmanship.

Our respectful requests are:

1. That the President will call the attention of the country to the pressing necessity for support of railroad credit by the co-operative and sympathetic effort of the public and of all governmental authorities, and that the railroads be relieved as far as possible of further immediate burdens involving additional expense; and,

2. That the President will urge a practical recognition of the fact that an emergency is upon the railroads which requires, in the public interest, that they have additional revenue and that the appropriate governmental agencies seek a way by which such additional revenue may be properly and promptly provided.

RAILWAY CONSTRUCTION IN THE CHINESE PROVINCE OF SHANTUNG.—At present there are two railways in operation in the Chinese province of Shantung; the Shantung railway from Tsingtau to Tsinanfu, 256 miles, and the Tientsin-Pukow line, 690 miles long, traversing the western portion of the province. Both of these lines are of standard gage. The former is German owned and operated. The latter, likewise a standard gage road, is divided into two sections. The northern runs from Huschowfu on the southern border of Shantung to Tientsin. It is 457 miles long and was built by the Germans. The southern section is 235 miles long and extends from Huschowfu south to Pukow on the Yangtse river. It was built by the British, but in common with the northern section is operated by Chinese. There are, however, a few German overseers on the German section and a few British overseers on the other. The Chinese government administers both sections as an undivided government railway under a European engineer in chief who of course has a voice in the ordering of supplies.

The Erection Equipment for the Quebec Bridge

A General Description of the Method Adopted and the Traveler Built for This 1,800-Foot Span

By H. P. BORDEN

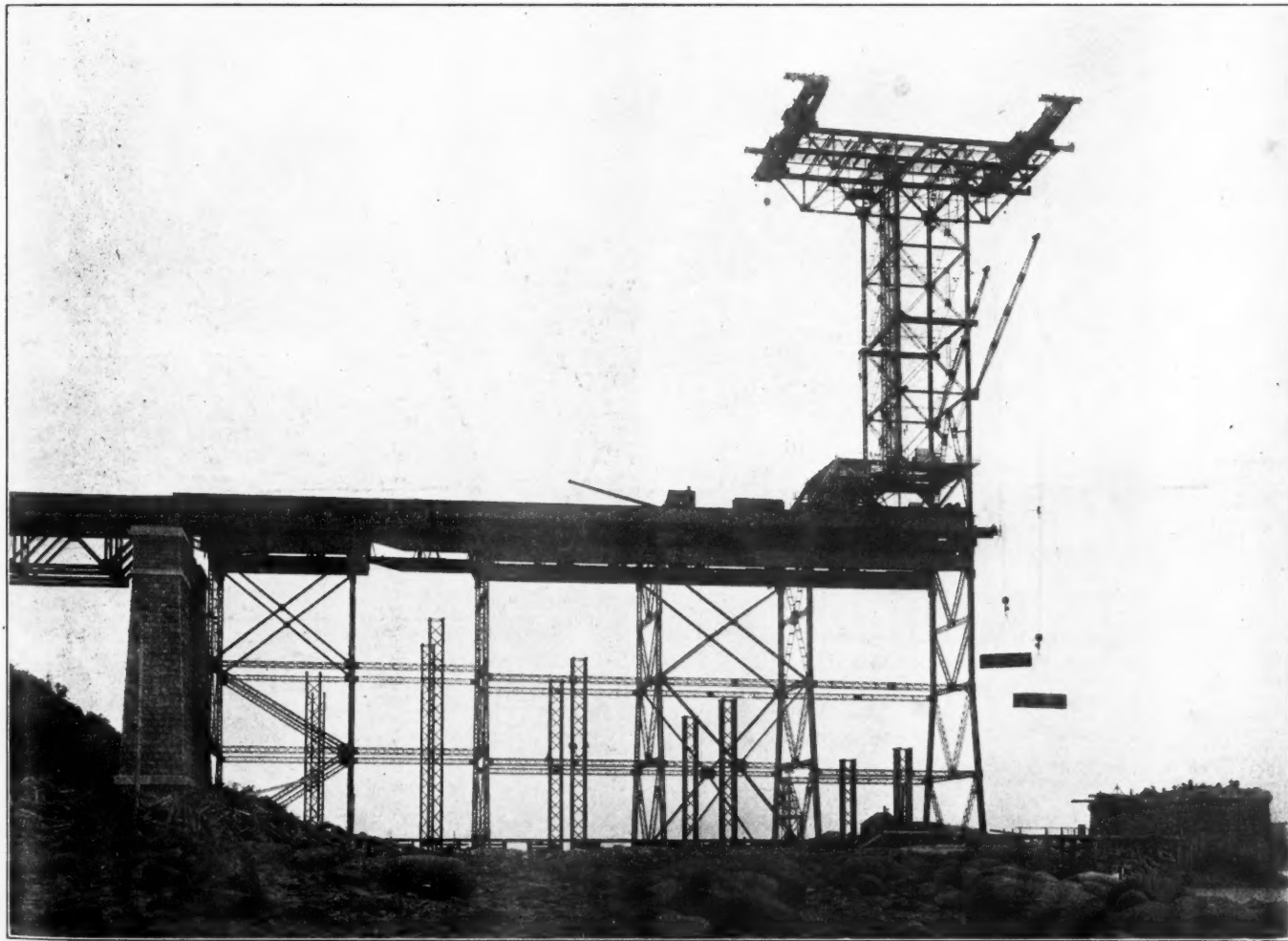
Assistant to Chief Engineer, Board of Engineers, Quebec Bridge.

During the present season considerable progress will be made towards the erection of the new Quebec bridge. The unprecedented weight and size of many of the members have created problems unusual in ordinary bridge erection. This phase of the work has been very carefully studied, the result being that every step has been thoroughly worked out and equipment has been designed to meet every emergency.

The center span is of the same length as that of the old bridge, namely, 1,800 ft. center to center of main piers, being divided into two cantilever spans 580 ft. long, and one suspended span 640 ft. long. The two anchor arms are each 515 ft. long center

Owing to the requirements of navigation, the center of the bridge for a distance of about 700 ft. is 150 ft. above extreme high water. In order to provide sufficient clearance for ships it was necessary to design the bridge with a one per cent grade entering from the abutments to the ends of the cantilever arms, the suspended span, however, being on a level grade. The extreme height of the bridge above the water did not entail any extra expense for approaches, due to the fact that the high banks on each side of the river conformed approximately to the required grade level.

In designing the plant required for the erection, the St. Law-

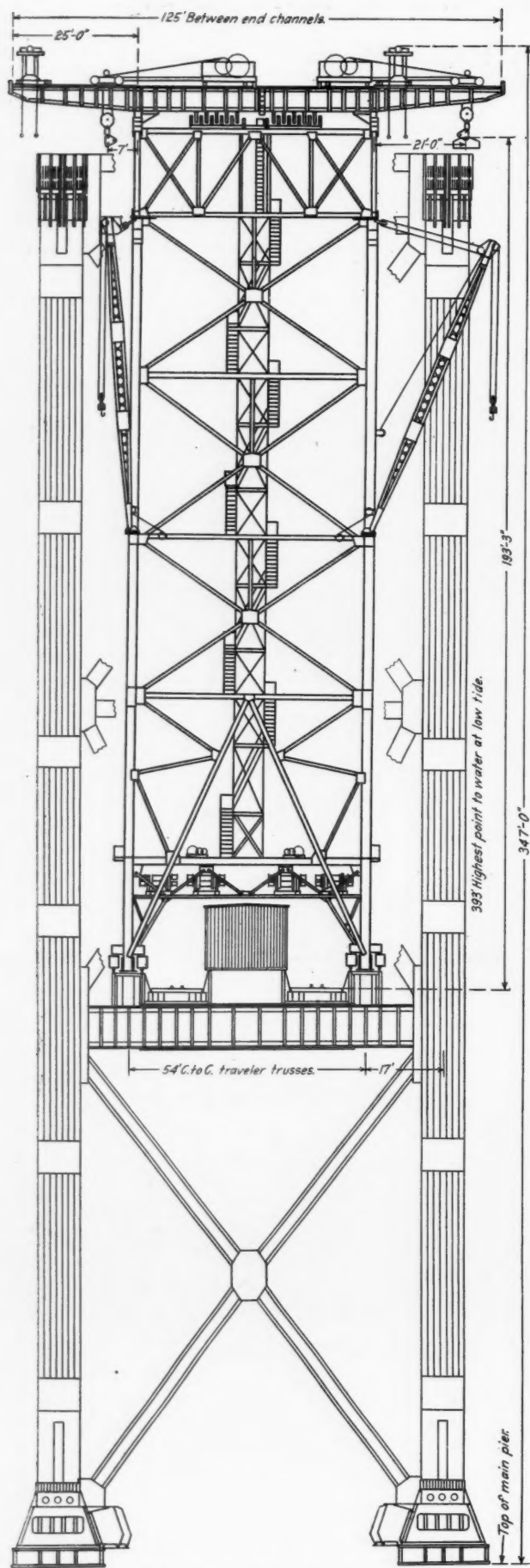


General View of the Traveler, Placing the Grillage for the Last Bent of Falsework

to center of piers. The main posts over the piers are 310 ft. high center to center, the cantilever and anchor arms tapering back to 70 ft. at each end.

The suspended span, being designed to be floated into position, is of a bow-string Pratt design 110 ft. high at the center. The trusses of the bridge are vertical, and are 88 ft. center to center. There are two approach spans on the north side between the anchor pier and the abutment 110 ft. and 157 ft. long, and one span 140 ft. long on the south side. The over-all length of the bridge is 3,239 ft. face to face of abutments.

rence Bridge Company, the contractors for the superstructure, spared no expense to develop an equipment that would combine the greatest efficiency with absolute safety. The bridge itself is situated about seven miles from Quebec in a more or less isolated district, and the difficulty of obtaining labor within a close radius was apparent. In order to provide accommodation for a large staff, and to locate them within a reasonable distance from the work, the company went to a large expense in fitting up a model camp at the bridge site. Bunk houses were provided for 250 men with an up-to-date kitchen and dining-



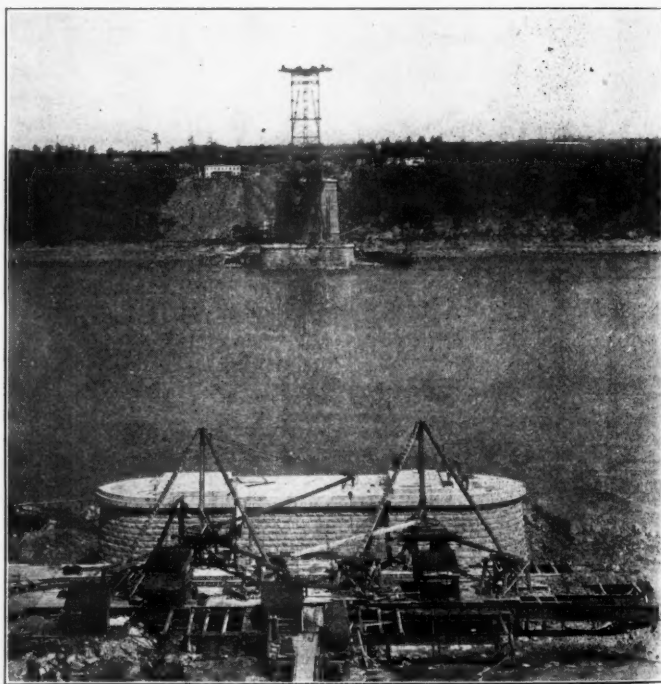
The Quebec Bridge Traveler Between the Main Trusses

room, bakery, wash rooms, recreation rooms, laundry, as well as general offices, hospital and police quarters. An efficient water supply service was inaugurated with fire protection and electric light. For the use of the officers of the company, several bungalows were also constructed in the vicinity.

As all the mechanical equipment is operated by electricity, power was obtained from the City of Quebec and transformed at the site to suit the various requirements of lighting, heating and operating machinery. A compressed air plant, operated by electricity, was also constructed on each side of the river. In the north and south handling yards, crane runways were established and equipped with traveling cranes having a capacity of 90 tons each.

ERECTION OF CANTILEVER SPANS

The main traveler, which will be used for the erection of the cantilever span proper, is of heavy steel construction, weighing when fully equipped approximately 1,000 tons. This traveler is about 200 ft. high from base of rail, and is supported on four buggies of six wheels each, running on four lines of tracks at the floor level. The upper arms of the traveler extend 50 ft. fore and aft of the main tower. On the top of the traveler two electric cranes are located, running on tracks parallel to the center line of the bridge. On each of these cranes are two trolley hoists running at right angles to the center line of the



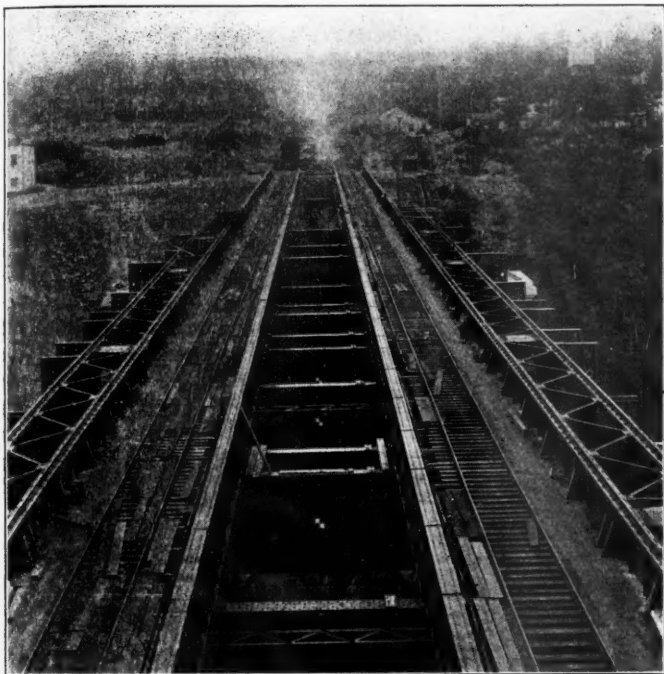
General View of the Crossing Showing the Traveler on the North Shore

bridge, thus commanding every point within their radius. These cranes have a capacity of 110 tons with a 35-ft. overhang, and have an out-to-out reach of 47 ft. 6 in. on each side of the center line. All the movements of these cranes, as well as the operation of the hoists, are controlled by one man at two switch boards located on the bridge of the traveler at the lower platform. By this means the superintendent can stand by the side of the operator, and in an ordinary conversational tone give instructions as indicated by the foremen at the different points where the work is going on. The operator can also see all operations at close range, and consequently can use better judgment in operating the hoists.

In order to avoid any possibility of accident, automatic electric brakes are attached to every machine, which will prevent the machine running away should anything happen to the electric current. In lowering a heavy member, the machines, operating through electrical resistance, have to work just as hard as in

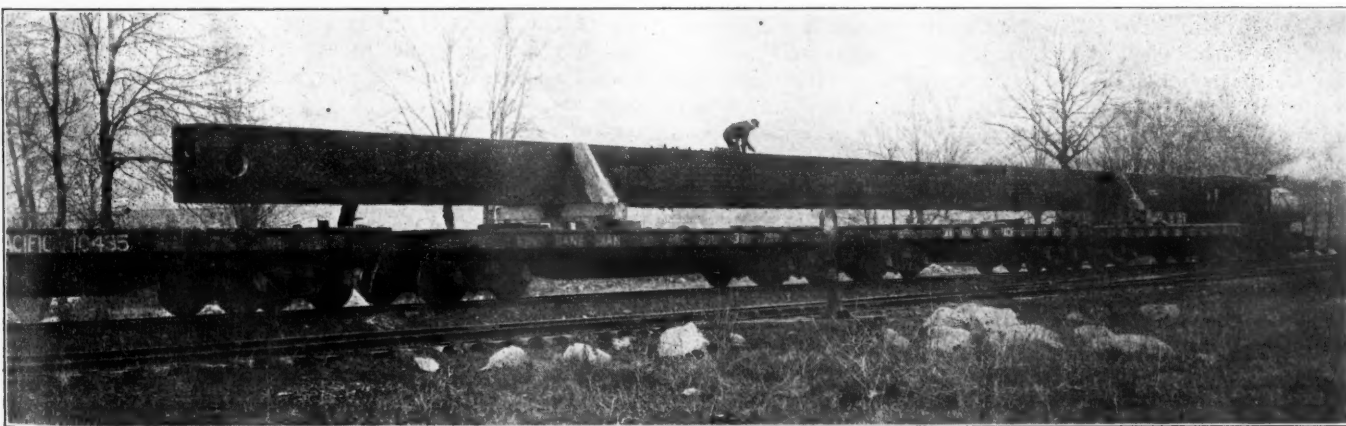
the operation of lifting. Should a fuse burn out, it is impossible for the load to move until the proper connection is again made. By this means the mechanism is made as nearly fool-proof as it is possible to make it.

Four small gantry cranes with two six-ton hoists each are also situated at the extreme ends of the crane girders on the top of the traveler, and are used to handle pins and other small material in line with the trusses. These gantry hoists are also



View Looking Back from the Traveler Showing the Four Lines of Rails Carrying the Traveler

operated from the bridge at the lower level. At each of the four corners of the main tower, steel booms have been installed having a reach of 90 ft. and a capacity of 20 tons each. These booms are operated by four electric hoists on the lower deck, and are used to handle smaller members between the trusses, such as the floor system and lateral and sway bracing.



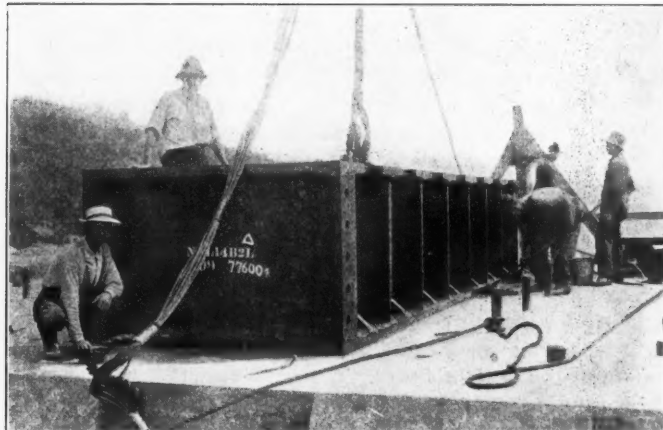
View Showing One Half of Diagonal Tension Member 108 ft. Long on Cars for Shipment

In order to facilitate reaching all parts of this traveler for inspection or other purposes, an electric elevator travels from the main deck to the floor under the crane girders at the top. There is also a stairway around this elevator for emergency purposes. In order that the progress of the work may not be held back, a second traveler, a duplicate of the one already erected on the north side, is now being constructed for use on the south side and will be in operation next spring. These two travel-

ers, fully equipped, will cost in the neighborhood of \$500,000.

ERECTION OF APPROACH AND ANCHOR SPANS

The north approaches, consisting of two Warren-type truss spans 110 and 157 ft. in length, respectively, were erected complete last fall. As the railway tracks are 32 ft. center to center, each span is composed of two distinct bridges, each carrying one track. The railway floor is trough-shaped, being in fact a series of through plate girder spans with sub-floor beams and track stringers. These track stringers are heavily reinforced with gusset plates and inverted channel top flanges in order to provide an extra factor of safety to the bridge as a whole in case of derailment. In the case of the approach spans these track girders



Placing One of the Four 40-Ton Castings That Form the Base of Each of the Main Shoes

are carried directly on the top of the vertical posts of the trusses which posts extend through the top chords.

The approach spans were erected with two traveling derricks before the main traveler was constructed. The shorter span, from the abutment to the intermediate pier, was supported on wooden falsework at the first and third panel points, the two outside panels being cantilevered out to the intermediate pier. The span was lowered to its proper position on the pier members by means of sandjacks on the falsework. The longer of the approach spans was erected in the same manner, with the exception that

steel falsework was used throughout. This falsework was so designed that it could be taken down and reused for the falsework of the anchor arm.

The falsework for the anchor arm consists of two distinct sets, known as the inside and outside falsework. The inside falsework carries the floor and the traveler up to the time the anchor arm is swung. The outside falsework is of varying length from the main pier to the anchor pier and supports first the bottom chords

and finally the entire weight of the anchor arm with the exception of the floor system.

The main traveler is used to erect this anchor arm falsework. Two of the lines of rails upon which this traveler runs are placed on the top flange of each of the outside track girders, the other two lines of rails being placed on special erection girders located about 4 ft. outside of these track girders and connected to the falsework bridge floor by special inclined struts and bracing. As each panel of the inside bracing is erected, the permanent floor of the bridge is placed in position. This does not apply to the main floorbeams which attach to the trusses of the anchor arm. These are put in a temporary position to accommodate present erection purposes and will not be put in their permanent position until the web members of the anchor arm trusses are erected in place.

There are seven bents of falsework for the inside staging and six bents for the outside. This staging and flooring is now practically all in place between the anchor arm and the main north pier, and the work of setting the shoes is going ahead. These shoes are approximately 26 ft. by 21 ft. at the base, are 19 ft. high and are shipped in seven sections, the heaviest of which weighs 70 tons. The shoe as a whole weighs over 400 tons.

If no unexpected delay occurs, it is expected that most of the anchor arm, or in the neighborhood of 10,000 tons, will be erected during the present season. During the coming winter the traveler for the south side will be erected and next season work will be started on the south shore, both sides working simultaneously towards the center. The cantilever arms will, naturally, be erected without staging. In order to save practically a year in erection, the big suspended span will be erected on the shore, in the vicinity of the bridge, and floated into position, being lifted from the pontoons by means of enormous hydraulic jacks.

The work is under the direction of the Board of Engineers, Quebec Bridge, a commission appointed by the Dominion government, and is composed of C. N. Monsarrat, chairman and chief engineer, Ralph Modjeski, and C. C. Schneider.

UNNECESSARY TELEGRAPHING*

By W. H. HALL

Superintendent of Telegraph, Missouri, Kansas & Texas

... I find that we still have a few officers and employees who believe that the telegraph rules, the telegraph code, etc., were made for the other fellow, and do not apply them. Recently I was told that the traffic department people were using the code to some extent and using symbol letters and numbers on a large majority of their telegrams; but that the operating department people do not seem to be doing so well. This was to me an astonishing statement, but I found that, generally speaking, it was correct. [Mr. Hall here quoted a telegram of the traffic department of 33 words which ought to have been put into 17. Other examples of lack of care were a message from a roadmaster ordering grass to be cut around bridges and directing responses, by wire, from 40 section foremen; and one from the passenger department, and one from the legal department omitting symbols, and thus necessitating unnecessary words in the reply. Six relaying offices found in one day 400 messages lacking symbol letters or numbers.]

In August, 1913, the telegraph department issued a telegraph code of about 75 code words, covering sentences used many times each day by all departments. Some of the departments are using this code, with a marked decrease in the length of telegrams. Others are not making any use of it. I quote a few words that can be used to advantage by all departments.

| | |
|-----------|---------------------------------------|
| Anxiety: | All concerned are instructed to rush. |
| Arrow: | Urgent that we have quick action. |
| Converse: | Referring to our conversation. |
| Decision: | What action has been taken. |
| Exact: | Advise if now O. K. |

*Abstracted from a paper read at a staff meeting at Galveston, June 22, 1914.

| | |
|------------|---|
| Hearken: | Have matter up and will advise soon as possible. |
| Hindrance: | Advise by wire what is delaying. |
| Home: | Referring to my letter of..... |
| Stimulate: | Very urgent, immediate attention and reply requested. |
| Searching: | Will investigate and advise you. |

There are others just as good. I heard an employee the other day dictating a telegram, and by the use of four or five code words a message that would have contained probably fifty words was cut down to about twelve. It was a revelation, even to me, of the economy that can be effected by an intelligent use of this code.

As our railway increases in mileage and cities increase in size and industries multiply, there will be a legitimate growth in the number of telegrams, and I have found the management willing to meet this demand for additional facilities; but unwilling to have the telegraph service used for unimportant and unnecessarily long communications.

I believe that fully 25 per cent of the messages now being handled by wire could be handled by letter and serve every purpose. Recently on a certain middle west railroad the management came to the conclusion that there was too much telegraphing being done, and in one relay office, where there had been 24 men employed, they cut the force to 5. Clerks were put on and it was left to the discretion of the manager as to what messages should be sent by wire and what messages should be sent by mail; and, while their service has suffered to some extent, still it has been shown that a large proportion of the messages heretofore handled were unnecessary.

THINK OF THE ENGINEMAN

Many automobile drivers are daily "flirting with death" by failing to observe the highway regulation, "stop, look and listen," when approaching railway crossings; and, commenting on this, the press agent of the Southern Railway, calls attention to the experience of M. C. Glenn, an engineman of that road, on September 3. "Yesterday," said Mr. Glenn, "I was engineer on train No. 108 and at Williams Crossing, about four miles west of Raleigh, I only missed striking an automobile by about two seconds, and in this automobile were grown people and children. If I had struck the automobile some one would have said that the engineer failed to sound the whistle; when in fact, I had just whistled for Thompson, answered a signal from the conductor, and had blown a road-crossing signal. The bell was ringing also, but the driver of the auto evidently did not hear any of the signals; for when I came in sight of him, which was only for a short distance, on account of a curve in the track, he averted a collision by suddenly cutting his car to the right, and I passed within 10 or 12 ft. of him." And the "some one" who in cases like this says that the engineman was at fault, usually proves to be a witness for the plaintiff in a lawsuit against the railroad; and jurymen who do not believe his statement are rare. Mr. Glenn's experience should go on record, for it is an instance where the runner's testimony was not contradicted.

CANALS IN NORWAY.—An old scheme for a waterway between Lake Mjösen, Norway, and the sea is again being given attention, and as a first step the part canalization of the Glommen is being advocated. The building of several dams on the section Vamma-Mörkfas will facilitate the solution of this important question by the Glommen being made navigable from Oieren to Sarpsborg and on to Frederikstad. Lock will have to be built by the side of the dams already built, or about to be built, but this is not expected to present any difficulties. The water level above the Sarpsfos Falls will have to be raised to a mean of 77 ft. above the level of the sea, in order to make the canalization of Glengshölen efficient. The passage round the Sarpsfos Falls, will be solved by means of a combination of locks and tunnel, and the whole scheme is looked upon as feasible also from a financial point of view.

Oxy-Acetylene Welding and Cutting on the Frisco

Large Savings Made by Use of Central Generating Plant and Piping System to Different Shop Departments

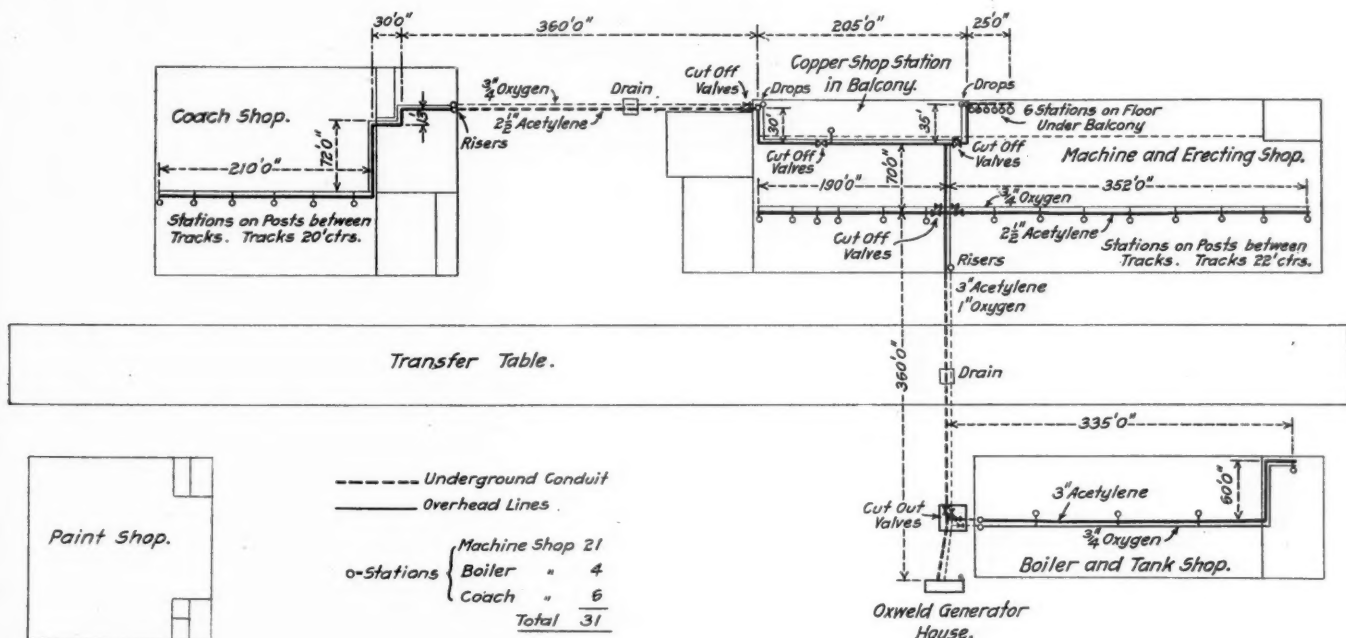
After about two years experimental work with apparatus that did not prove satisfactory, the St. Louis & San Francisco decided to install a complete modern plant for oxy-acetylene welding and cutting on a large scale at the Springfield (Mo.) shops. With the object of extending its use to the several departments of the locomotive and car repair shops, it was decided to install a central generating plant and to pipe the gases to the various departments, providing outlets at the several points where this process would be required, either for welding or cutting. This was done in the belief that in the end it would prove more economical to install and maintain such a plant than to follow the practices either of bringing the work to a central point or trucking the oxy-acetylene apparatus to the different places. A study of the extent to which oxy-acetylene welding and cutting is now being used throughout the shops and the resulting savings, seems to amply justify this decision.

So successful has the plan worked out that similar installations have been made at the old north shops at Springfield and at the

welding operators have been selected from the various departments of the shop and are assigned as nearly as possible with reference to their trades and qualifications. The scope and variety of the work is continually increasing, as the welders become more and more proficient in handling the apparatus and as the shop management becomes more familiar with its possibilities.

Some idea of the extensive area which is served at the new Springfield shops may be gained from the fact that there are 6,204 ft. of piping, divided as follows: For acetylene, 60 ft. of 4 in. pipe, 745 ft. of 3 in., 1,677 ft. of 2½ in. and 620 ft. of 1 in. For oxygen, 390 ft. of one 1 in. pipe, 2,092 ft. of ¾ in. and 620 ft. of ½ in. There are 21 outlets or stations in the machine and erecting shop, four in the boiler shop, and six in the coach shop. As shown on the diagram, the piping between the buildings is placed underground, while that inside is carried overhead. In the erecting shop and in the coach shop, the outlets are placed on the columns between the pits or tracks.

At the north shops in Springfield there are 4,500 ft. each



Plan of the Oxy-Acetylene Layout at the Springfield New Shops of the St. Louis & San Francisco

reclamation plant at Springfield, which is located in the old Kansas City, Fort Scott & Memphis shops, which were practically abandoned when the new Frisco shops were built several years ago. Other small plants have also been installed at Birmingham (Ala.), Chaffee (Mo.), Enid (Okla.), Kansas City (Kan.), Memphis (Tenn.), and Sapulpa (Okla.). The railroad company was not put to any capital expense in building and equipping these plants. They were furnished by a service company which also provided in its contract for supervision and instruction as to methods, free of charge, and conditioned only on the purchase through the service company of oxygen, carbide and other necessary supplies at the usual and current market prices.

THE APPARATUS

The installation at what is known as the new shops at Springfield is by far the largest of the nine plants thus far placed in operation on the Frisco. Twenty operators are regularly employed; of these four are in the machine and erecting shop, eleven in the boiler shop, three in the blacksmith shop, one in the coppersmith department and one in the coach shop. The

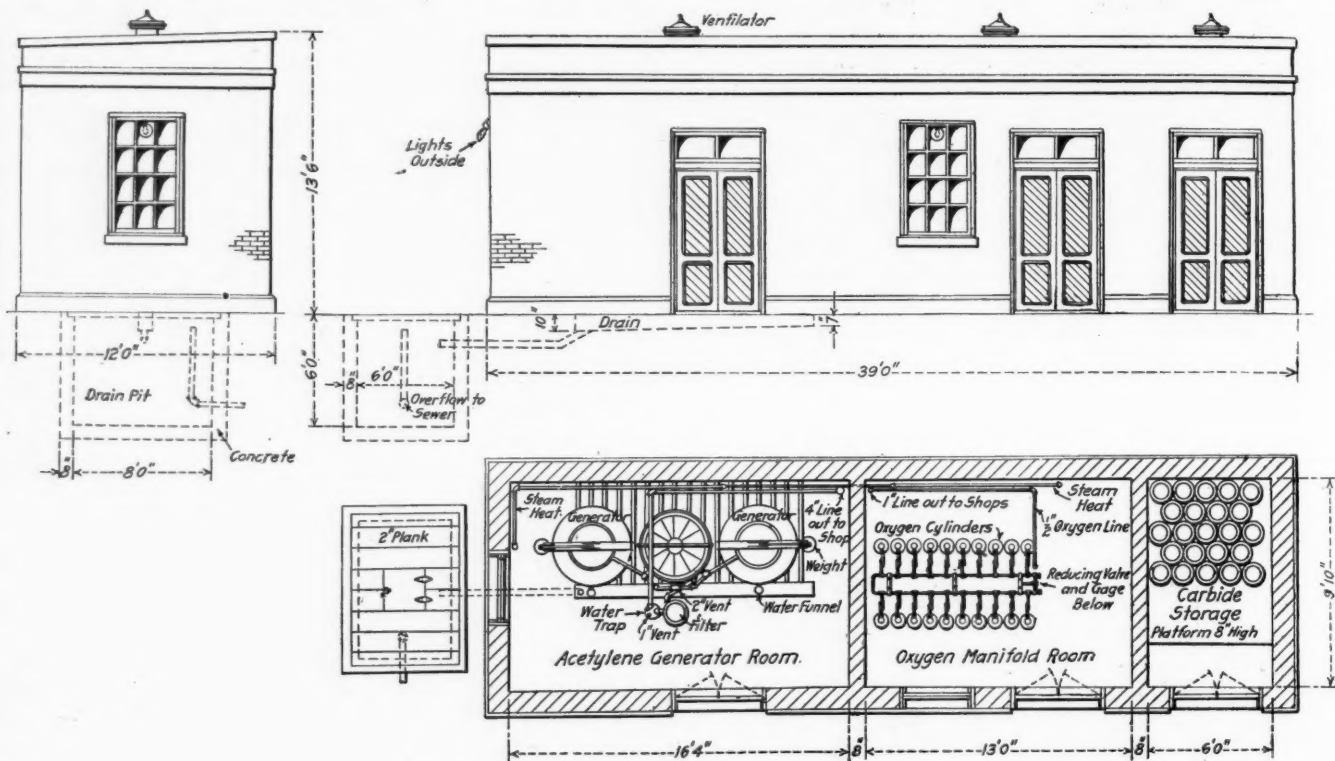
of acetylene and oxygen piping, with 25 drops or outlets. Three of these outlets are in the erecting shop, three in the machine shop, 10 in the freight car repair yard, two in the motor shop, two in the coach shop, three in the boiler shop and two in the tin shop. At the reclamation plant there are 1,060 ft. of piping and 16 outlets. This article will consider only the work which is being done in the new shops and the north shops, that at the reclamation plant being reserved for a later article descriptive of that plant.

The arrangement of the apparatus in the generator house at the new shops is clearly shown in the illustrations. The greater part of the building is used as an acetylene generator room. Here is placed the Oxweld low-pressure duplex generator which consists of two acetylene generators and one gasometer. The generators may be operated independently of each other, the advantage of the duplex arrangement being that one generator may be in operation, while the other is being recharged. The generators operate automatically and require only a comparatively small amount of attention.

The oxygen containers are grouped in two rows in another

room and are connected to a manifold by flexible copper pipes, as shown in one of the photographs. Only one or two of the cylinders are opened into the manifold at one time. As soon as a tank exhausts its supply, which is indicated by the pressure gage, it is cut off and a fresh tank is cut in; as soon as convenient the empty tank is then removed and replaced by a filled one. The reducing valve regulates the pressure to the piping

for making similar repairs. At the new shops, for instance, a report is made on each operation on a special form which is shown in one of the illustrations. This is made up by the shop checker or foreman, and is referred to the chief clerk of the shop superintendent, who personally checks the data to insure its accuracy. The accompanying statement is taken at random from one of a large number of records on file in the shop super-



Oxweld Generator House at the Springfield New Shops

system. The cans containing the carbide are stored in still another part of the house, as shown on the plan.

The building at the new shops at Springfield is a substantial brick structure, agreeing with the style and architecture of the other buildings in the plant. At other places, and particularly

intendent's office and will give some idea of the care and thoroughness with which the railroad has checked the comparative costs.

As noted, each item is separately considered, the cost by the Oxweld process being determined by totaling the labor cost, the

STATEMENT SHOWING WORK PERFORMED WITH OXWELD WELDING PLANT AT NEW SHOPS, SPRINGFIELD, AND COST DURING JANUARY,* 1914

| Articles Cut or Welded | Date | Time welding or cutting | Rate per hr., cents | Amount of labor | Cost per blow pipe hr. | Total cost | Material | Labor | Total | Saving |
|---|------------------|-------------------------|---------------------|-----------------|------------------------|------------|----------|---------|---------|---------|
| Welding frame 2 x 4..... | Eng. 294 1-2-14 | 3 hr. 15 min. | 41 | \$1.33 | \$3.70 | \$5.03 | \$3.40 | \$44.10 | \$47.50 | \$42.47 |
| Welding crank arm 2½ x 3..... | Eng. 747 1-2-14 | 2 hr. 30 min. | 41 | 1.02 | 2.85 | 3.87 | ... | 6.35 | 6.35 | 2.48 |
| Cutting eight frame bolts 1¼ in. diameter..... | Eng. 3707 1-2-14 | 1 hr. | 41 | .41 | 1.14 | 1.55 | ... | 3.96 | 3.96 | 2.41 |
| Welding worn place in frame ¾ x 4 x 5..... | Eng. 3707 1-2-14 | 2 hr. | 41 | .82 | 2.28 | 3.10 | ... | 7.60 | 7.60 | 4.50 |
| Welding two brake hanger pins worn..... | Eng. 3707 1-2-14 | 2 hr. | 41 | .82 | 2.28 | 3.10 | ... | 7.60 | 7.60 | 4.50 |
| Cutting tail piece ½ x 3 ft..... | Eng. 3707 1-2-14 | 30 min. | 41 | .20 | .57 | .77 | ... | 2.64 | 2.64 | 1.87 |
| Cutting off 445 staybolts 1 in. in diameter..... | Eng. 773 1-2-14 | 10 hr. | 41 | 4.10 | 11.40 | 15.50 | ... | 23.10 | 23.10 | 7.66 |
| Cutting one hole in smoke arch ¼ x 7 and 10 holes ¼ x ½ | Eng. 728 1-2-14 | 45 min. | 41 | .30 | .85 | 1.15 | ... | 3.30 | 3.30 | 2.15 |
| Cutting two holes in running board ¼ x 1½..... | Eng. 707 1-2-14 | 15 min. | 41 | .10 | .28 | .38 | ... | 1.98 | 1.98 | 1.60 |
| Cutting top of cab ¼ 10 ft. 8 in. and six holes ¼ x ½ | Eng. 765 1-2-14 | 1 hr. | 41 | .41 | 1.14 | 1.55 | ... | 4.62 | 4.62 | 3.07 |
| Cutting one hole in cab ¼ x 4 in. and one hole ¼ x 1½ and four ¼ x ½..... | Eng. 877 1-2-14 | 30 min. | 41 | .20 | .57 | .77 | ... | 2.64 | 2.64 | 1.87 |
| Cutting two deck braces 1¼ x 4 in..... | Eng. ... 1-2-14 | 30 min. | 41 | .20 | .57 | .77 | ... | 2.64 | 2.64 | 1.87 |
| Cutting ash pan ¼ x 2 ft. 10 in. and two holes ¼ x 2 in. | Eng. 490 1-2-14 | 30 min. | 41 | .20 | .57 | .77 | ... | 2.64 | 2.64 | 1.87 |
| Welding two cracks in door collar ¾ x 1½ and two ¾ x 4 | Eng. 816 1-2-14 | 2 hr. | 41 | .82 | 2.28 | 3.10 | 1.96 | 9.24 | 11.20 | 8.10 |
| Heating two flue sheets corners..... | Eng. 816 1-2-14 | 30 min. | 41 | .20 | .57 | .77 | ... | 1.98 | 1.98 | 1.21 |
| Cutting two patches on door sheet ¾ x 7..... | Eng. 816 1-2-14 | 30 min. | 41 | .20 | .57 | .77 | ... | 1.98 | 1.98 | 1.21 |
| Cutting ash pan 3/16 x 12 in..... | Eng. 728 1-2-14 | 30 min. | 41 | .20 | .57 | .77 | ... | 1.98 | 1.98 | 1.21 |
| Cutting tail piece ½ x 8..... | Eng. 773 1-2-14 | 1 hr. | 41 | .41 | 1.14 | 1.55 | ... | 4.62 | 4.62 | 3.07 |
| Heating crown sheet..... | Eng. 765 1-2-14 | 30 min. | 41 | .20 | .57 | .77 | ... | 1.98 | 1.98 | 1.21 |

*This shows only a few of the items for January 2.

the smaller points, much less pretentious buildings are used, such, for instance, as the one at Birmingham (Ala.), which is shown in one of the photographs.

COMPARATIVE COST OF DOING WORK

Accurate and thorough records have been kept of the comparative cost of doing the work with the use of the oxy-acetylene apparatus and by the methods which were formerly employed

gas cost and the expense of supervision, operation and maintenance of plant.

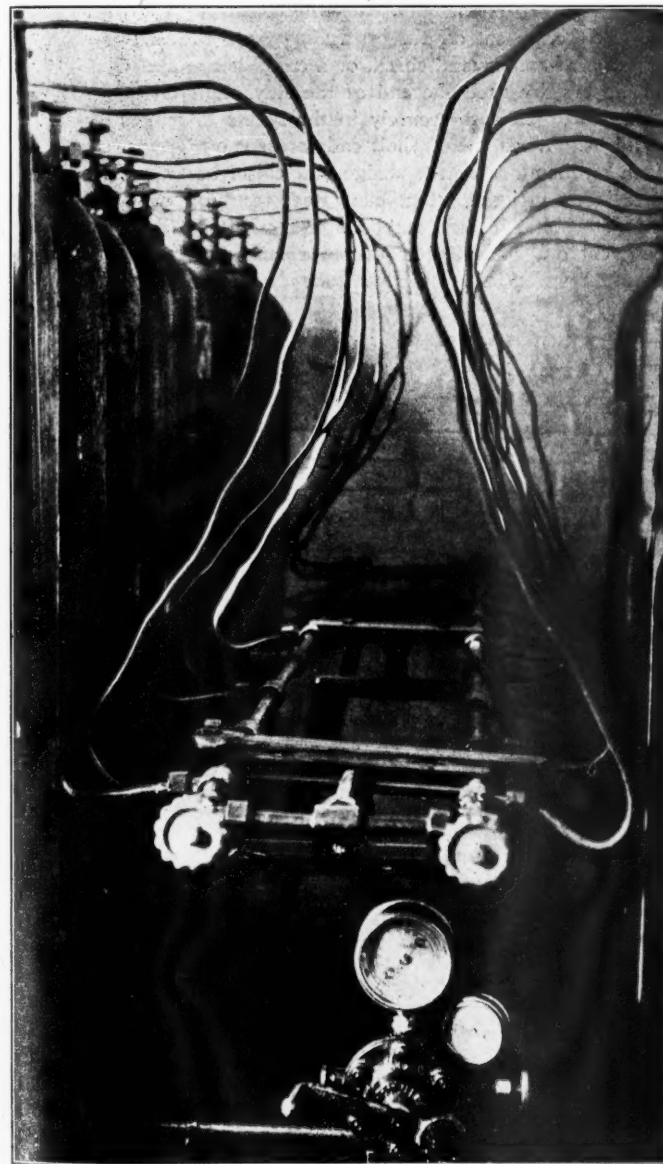
The average cost per burning hour of the gas consumed is determined by dividing the total expenditure for gas and gas making material by the number of hours worked by burner operators. The cost of gas per burner hour is influenced by a number of factors and the lowest cost does not necessarily denote the greatest efficiency of operation. A lower gas cost per

burner hour may be due to the large per cent of time lost by the operator during which the flame is not actually burning. A higher cost, on the other hand, may be due to a wasteful use of gas, accounted for by an improper mixture or by allowing the



Oxweld Generator House for the Frisco at Birmingham, Ala.

flame to burn while not actually welding. Obviously, the cost per burner hour is not an acceptable measure of welding efficiency. The most equitable comparison may be made between the performance at different plants, or different periods at the



Oxygen Manifold in the Generator House

same plant, by using the economy effected by burner hours, or per dollar expended for gas.

The cost of making repairs by former methods is arrived at as follows:

In all cases where, in the absence of the Oxweld plant, the parts would have been scrapped, the cost is computed by deducting the scrap value of the old parts from the cost of new material.

In all cases where it would have been necessary to remove the parts to complete repairs by other methods, the cost of removing and replacing has been added to the cost of effecting repairs.

In cases where, by either the Oxweld or other methods, the parts would have been removed, the cost of repairs in the blacksmith, machine or other shops is considered as against the cost by the oxy-acetylene process.

The following table shows in detail the welding operations which were performed at the new Springfield shops for the

SAVINGS BY INDIVIDUAL ITEMS—SPRINGFIELD NEW SHOPS, JULY 1, 1913, TO JUNE 30, 1914

| Parts | Pieces | Other method | Oxy-Acetylene | Saving |
|---------------------------------|--------|--------------|---------------|-------------|
| Ash pans | 637 | \$456.44 | \$904.34 | \$1,384.10 |
| Brackets | 391 | 858.22 | 332.04 | 466.13 |
| Braces | 661 | 2,562.42 | 1,066.34 | 1,496.08 |
| Bolsters | 13 | 231.57 | 24.87 | 206.70 |
| Crossheads and pistons..... | 254 | 3,873.68 | 572.37 | 3,301.31 |
| Center castings | 26 | 172.44 | 63.18 | 109.26 |
| Center plates | 2 | 98.50 | 6.44 | 92.06 |
| Cylinders | 23 | 6,105.88 | 89.21 | 1,516.67 |
| Driving boxes | 240 | 1,644.21 | 355.74 | 1,288.47 |
| Drawbars | 12 | 127.08 | 11.93 | 115.15 |
| Driving wheels | 3 | 133.58 | 36.13 | 97.45 |
| Door collars and sheets..... | 400 | 6,974.09 | 1,955.39 | 5,018.70 |
| Deck castings | 1 | 71.30 | 3.02 | 68.28 |
| Equalizers | 236 | 735.23 | 416.65 | 318.58 |
| Engine frames | 567 | 9,172.80 | 2,316.86 | 6,855.94 |
| Front end ring..... | 45 | 404.65 | 140.88 | 263.77 |
| Miscellaneous firebox work..... | 3,017 | 20,733.12 | 10,210.40 | 10,522.72 |
| Lubricators | 3 | 105.00 | 3.54 | 101.46 |
| Flue sheets | 261 | 3,866.53 | 1,137.97 | 2,728.56 |
| Shop machines | 692 | 2,891.58 | 990.39 | 1,901.19 |
| Main rod braces..... | 8 | 141.89 | 10.46 | 131.43 |
| Miscellaneous repairs | 473 | 1,455.36 | 560.21 | 895.15 |
| Main rods | 146 | 1,184.90 | 404.99 | 779.91 |
| Miscellaneous parts | 4,914 | 19,640.32 | 8,865.29 | 10,775.03 |
| Oil boxes | 531 | 1,790.64 | 678.95 | 1,011.69 |
| Pedestals | 626 | 2,080.05 | 742.78 | 1,337.27 |
| Reverse lever strips..... | 368 | 989.01 | 471.70 | 517.31 |
| Rocker arms | 100 | 788.53 | 181.24 | 607.29 |
| Running boards | 374 | 770.61 | 383.02 | 407.59 |
| Steam chests | 5 | 45.99 | 23.37 | 22.62 |
| Steam pumps | 10 | 190.00 | 19.95 | 170.05 |
| Side sheets | 495 | 31,512.10 | 3,918.31 | 27,593.69 |
| Steam pipes | 62 | 249.11 | 102.96 | 146.15 |
| Truck boxes | 113 | 437.71 | 201.51 | 236.20 |
| Truck frames | 14 | 531.58 | 65.80 | 465.78 |
| Triple valves | 2 | 23.00 | 2.48 | 20.52 |
| Water columns | 4 | 151.00 | 30.71 | 120.29 |
| Total | | \$120,532.12 | \$37,340.42 | \$83,191.60 |

ECONOMY EFFECTED BY USE OF OXY-ACETYLENE PROCESS—APRIL 1, 1913, TO AUGUST 31, 1914

| Month 1913 | New shop | North shop | Re-claima- tion plant | Mem-phis | Kan-sas City | Sa-pulpa | Bir-ming-ham | Enid | Chaffee | Total |
|---------------------|----------|------------|-----------------------|----------|--------------|----------|--------------|-------|---------|---------|
| April | \$215 | \$200 | ... | ... | ... | ... | ... | ... | ... | \$415 |
| May | 1,121 | 240 | ... | ... | ... | ... | ... | ... | ... | 1,361 |
| June | 1,367 | 276 | ... | ... | ... | ... | ... | ... | ... | 1,643 |
| July | 2,034 | 266 | ... | ... | ... | ... | ... | ... | ... | 2,400 |
| August | 3,247 | 782 | ... | ... | ... | ... | ... | ... | ... | 4,029 |
| September | 5,652 | 604 | ... | ... | ... | ... | ... | ... | ... | 6,256 |
| October | 9,861 | 555 | \$163 | ... | ... | ... | ... | ... | ... | 10,579 |
| November | 5,248 | 1,140 | 1,116 | ... | ... | ... | ... | ... | ... | 7,504 |
| December | 5,683 | 1,518 | 1,501 | ... | ... | ... | ... | ... | ... | 8,702 |
| January, 1914 | 6,773 | 2,579 | 639 | ... | ... | ... | ... | ... | ... | 9,991 |
| February | 6,783 | 2,077 | 1,403 | ... | ... | ... | ... | ... | ... | 10,263 |
| March | 11,875 | 2,364 | 1,942 | \$50 | \$48 | ... | ... | ... | ... | 16,279 |
| April | 9,390 | 2,492 | 1,895 | 109 | 1,095 | \$17 | \$148 | ... | ... | 15,146 |
| May | 8,015 | 3,430 | 2,354 | 542 | 2,312 | 288 | 690 | ... | ... | 17,598 |
| June | 8,662 | 3,353 | 2,698 | 1,409 | 2,480 | 129 | 1,970 | ... | ... | 20,701 |
| July | 11,691 | 4,022 | 2,833 | 1,215 | 2,116 | 869 | 1,047 | \$115 | \$69 | 23,977 |
| August | 9,174 | 2,951 | 2,720 | 1,969 | 2,198 | 1,805 | 1,676 | 1,445 | 582 | 24,520 |
| Total | 106,793 | 28,940 | 19,264 | 5,294 | 10,249 | 3,108 | 5,531 | 1,560 | 651 | 181,364 |

twelve months ended June 30, 1914, giving also the direct labor and material cost of the repairs made by the oxy-acetylene process, the estimated cost by former methods, and the estimated saving effected by the use of the oxy-acetylene method. No attempt has been made to take into consideration the overhead or indirect expenses as they practically offset each other in both cases. This saving does not include a large number of minor operations of insufficient importance to justify the labor of recording them separately. Nor does it take into consideration the indirect saving due to time saved. For instance, if a locomotive is assumed to be worth \$25 a day and a freight car 45

cents a day, the amount saved by returning them to service several days sooner than would otherwise be the case would be very considerable.

The chart showing the relative savings due to the use of oxy-acetylene for various groups or classes of repairs is of more than ordinary interest and indicates that its greatest use thus far has been in connection with boiler repairs.

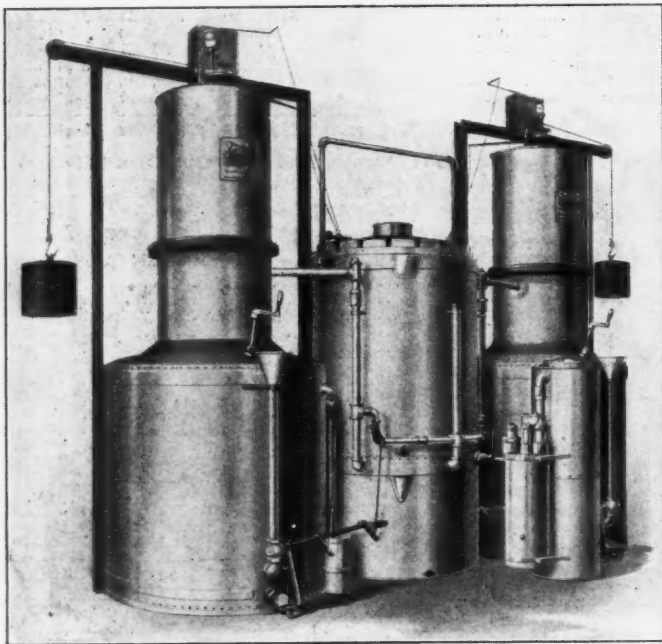
The table showing the saving effected by the oxy-acetylene



Oxweld Generator House at the Springfield New Shops

process from April 1, 1913, to June 30, 1914, is also of special interest because of indicating the extent to which this process is used at the various shops. The variety of work performed at the north shops and at the reclamation plant is so great that its listing would occupy more space than is available.

Sometimes figures of economies claimed are questioned as to their accuracy and authenticity. In order that the officers of the company might not congratulate themselves with unwarranted optimism or enthusiasm a thorough check of these accounting fig-



Oxweld Low-Pressure Duplex Generator

ures was recently made by Haskins and Sells, certified public accountants. The result determined the substantial accuracy of the figures quoted.

BOILER AND FIREBOX REPAIRS

All firebox sheets and patches are welded in instead of using rivets and patch bolts. The actual saving thus accomplished is very large, but even this is insignificant as compared to the sav-

ing made by lessening the running repair work at the engine houses and curtailing terminal delays. The Frisco now has in operation more than four hundred locomotives in which firebox sheets and patches have been welded. Seventeen of these have been reported as leaking. Careful inspection, however, developed the fact that four had pin hole defects in the welds while the remaining 13 had developed defects in other sheets than those welded.

When new staybolts are applied to fireboxes, the usual prac-

| STATEMENT OF WORK PERFORMED OXY-ACETYLENE PROCESS | | | | | | | |
|--|---------------|------------------|-------|---------------|-------|-------|----------------|
| DESCRIPTION OF MATERIAL | COST | | | | | | |
| | OXY-ACETYLENE | | | OTHER METHODS | | | |
| | Labor | Gas and Material | Total | Labor | Mat'l | Total | Saving or Loss |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

Form Used for Recording Comparative Costs of Performing Work by Oxy-Acetylene and Other Methods

tice is either to cut off the protruding ends with a staybolt nipper, an air hammer and chisel, or a chisel bar and sledge. When the nippers are used the end of the staybolt is crushed and the threads are held less securely in the sheets than they otherwise would be. When the staybolt ends are cut off, either by the use of an air hammer or the sledge and chisel bar, the hole in the sheet is to a slight extent elongated, resulting oftentimes in a loose staybolt. Where staybolts are carefully driven up after being cut off, such defects may not immediately cause trouble, but often within a short time leaks develop and after the bolt

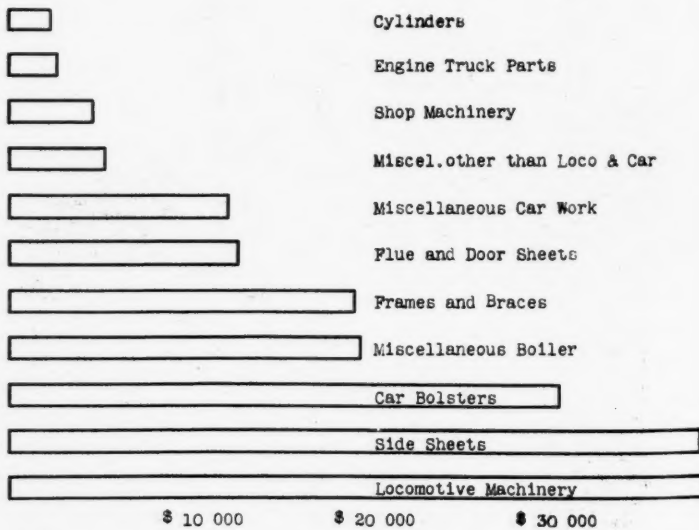


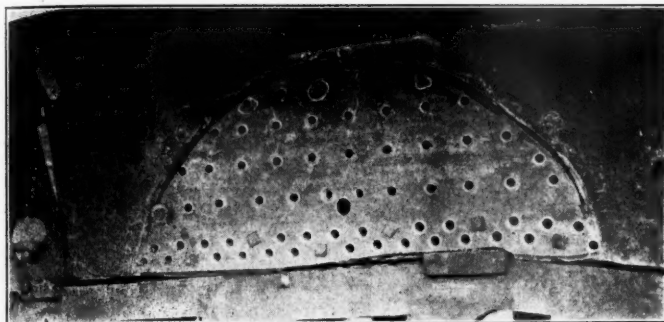
Diagram Showing Relative Saving on Various Classes of Work Repaired With the Oxy-Acetylene Apparatus for 17 Months, Ending August 31, 1914

has been calked a few times, and the metal of the head has worked away, the only way of stopping the leak is to remove the bolt from the sheet and apply a new one.

With the use of oxy-acetylene cutting burner the protruding ends may be cut off in less time and at no greater expense than by the other methods; when done in this way neither the bolt nor the sheet is injured and the end of the bolt is also annealed so that it may easily and properly be driven up.

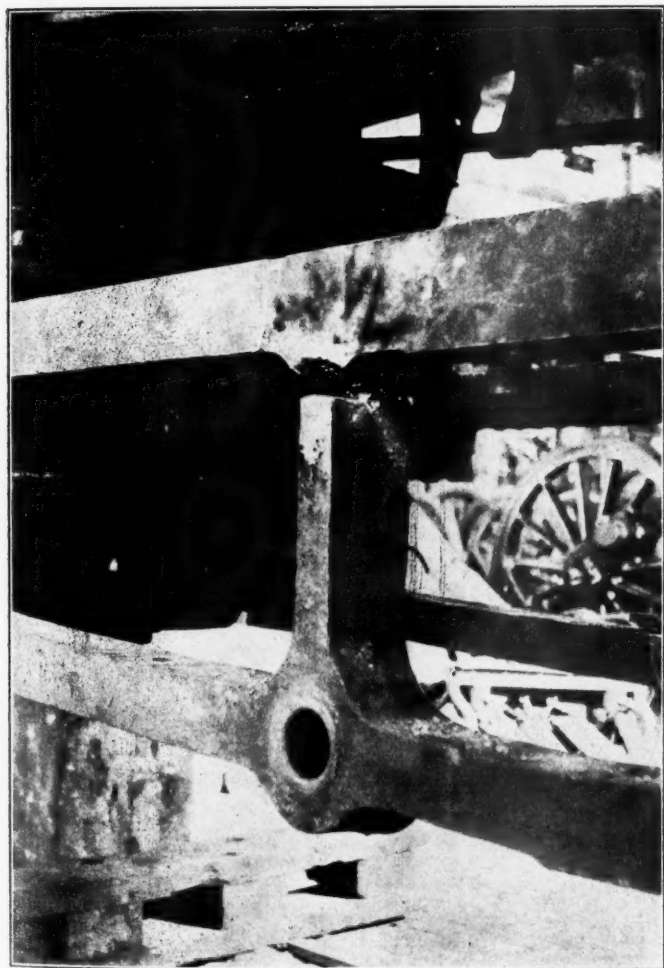
Two or three typical cases of repairs to fireboxes made by

the oxy-acetylene method are illustrated. One of these shows a welded door hole patch on engine 740. This patch saved the renewal of a door sheet, and except for the discoloration of the metal due to heat from the burner it is practically impossible to detect the weld. It cost \$21.10; it is estimated that if done



Patch in Place, Ready for Welding, on Firebox Sheet Worn by Driving Wheel

by former methods it would have cost \$81.68. One of the other views shows a firebox sheet, which had been badly worn by a driving wheel, with a patch in place ready for welding. The



A Difficult Frame Weld Accomplished by the Oxy-Acetylene Process

companion view shows the patch welded in by oxy-acetylene process.

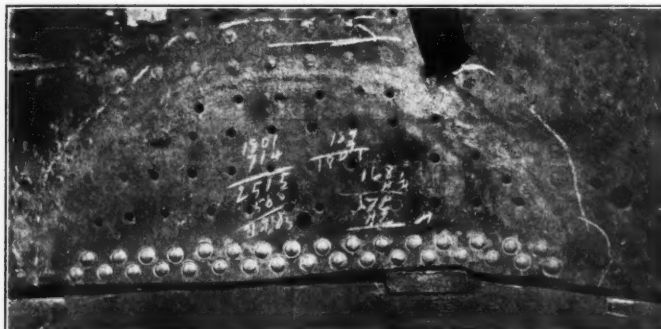
Following is a brief extract from a report made by one of the master mechanics:

We have engine 975 with a collar patch on the firebox door, and it is surprising to see the job that was done. There is no sign of a leak whatever. I also took guide yoke off of engine 1404, which was badly cracked

and patched, and sent it to the north shops at Springfield. It is a hard matter to detect where the weld was made; it is now as strong as ever, and saved applying a new one.

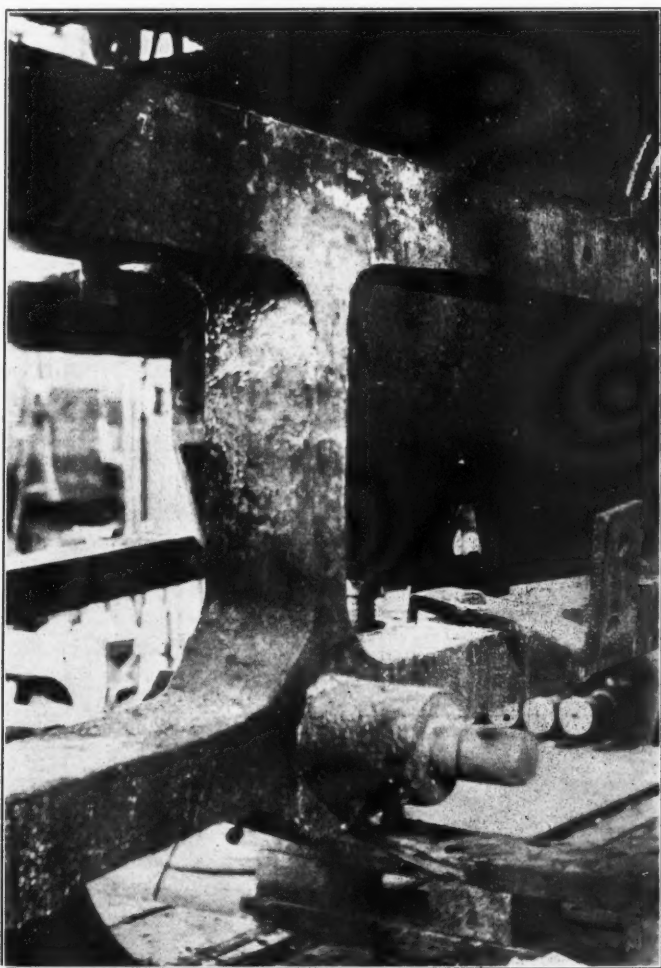
TUBE WELDING

The welding of tubes into the tube sheet has proved most successful. One engine had an entire set of tubes welded in 11



Firebox Patch Welded in Place by Oxy-Acetylene

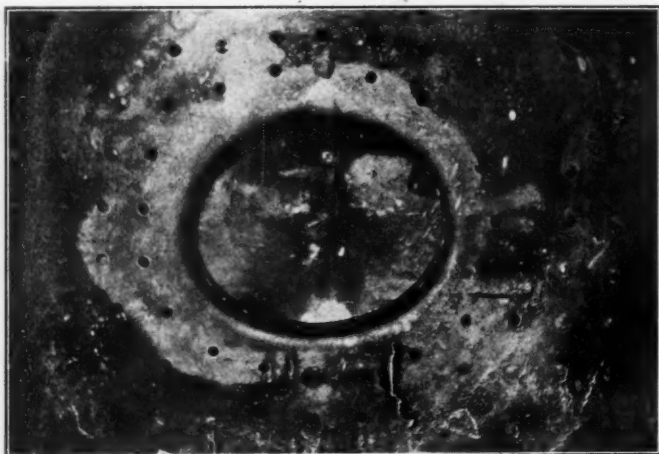
months ago and has been in continuous service since that time; it was recently inspected and the tubes were found to be in splendid condition. During this period no repairs have been



necessary to keep the tubes tight in the sheet and to prevent leaking. As a result of this experiment, the welding in of tubes has been adopted as a standard practice and all of the locomotives will be treated in this way as rapidly as the oxy-acetylene plants can handle the work.

While the original or first cost of welding in the tubes is higher than the ordinary practice of rolling and beading, this

additional expense is much more than compensated for by the advantages of the welded tubes. If the original welds are properly made the maintenance cost is reduced to practically nothing. This is especially appreciated by those in charge of the engine houses. In addition to the reduction in engine house work the life of both the tubes and the tube sheets will be increased, possibly as much as 50 per cent. With the continual rolling and working ordinarily done to stop leaks, the life is gradually worked out of the tube ends and the tube sheets are distorted, necessitating renewals at more frequent intervals than



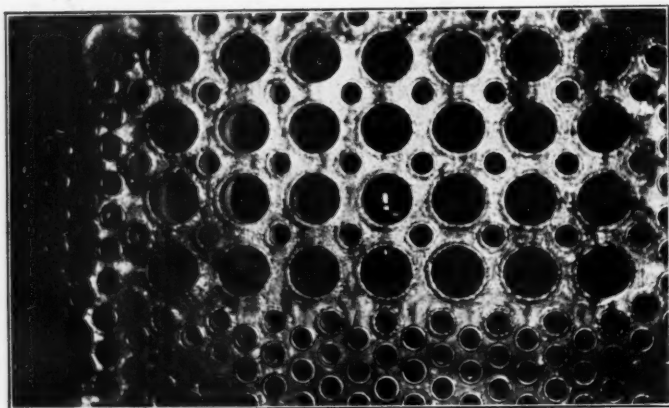
Fire Door Patch Welded in by the Oxy-Acetylene Process

is the case with welded flues where no work is necessary. One of the illustrations shows an installation of superheater tubes which have been welded into the tube sheets.

MISCELLANEOUS REPAIRS

As indicated on the chart which shows graphically the relative savings made by oxy-acetylene welding in the handling of different classes of repairs, the welding of locomotive frames plays a most important part at the new Springfield shops. Several of the photographs show repairs which have been made, either by welding broken frames or filling up worn places. This method has given uniformly good results.

Thus far the work accomplished at the new Springfield shops



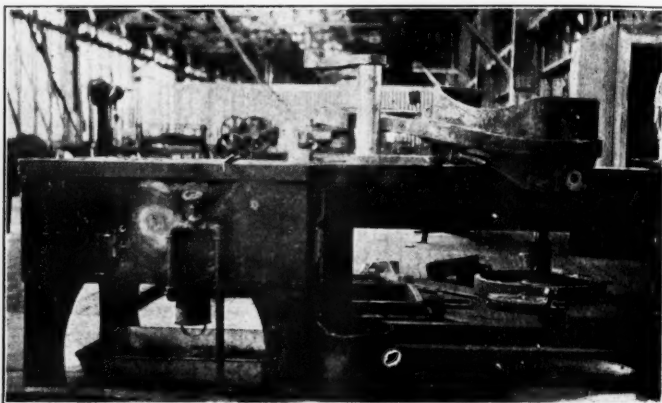
Superheater Tubes Welded into Tube Sheets

has been very largely in the line of boiler and frame repairs, although splendid use has been made of the apparatus in repairing broken machine castings and in welding various locomotive and passenger car parts. The volume of boiler work has prevented, or interfered with, this miscellaneous class of work. However, it is steadily increasing in volume. A few of the articles which have been thus repaired are shown lying on the bench and floor in the photograph of the pre-heating forge which is used by the oxy-acetylene welders in the machine and erecting shop.

A considerable amount of work has been done in filling up and re-enforcing worn side rods, some of which were originally of poor design. It is estimated that the saving effected in forming and welding on new ends amounts on the rods of a ten-wheel engine to approximately \$65.

The flange joints at the end of the water columns and spouts are subject to frequent breakage. Ordinarily this means the scrapping of the column and its replacement with a new one.

With the oxy-acetylene process broken flanges may be welded at a slight cost. As an instance of this sort, the water column at Monett, a most important point, was damaged in this way.

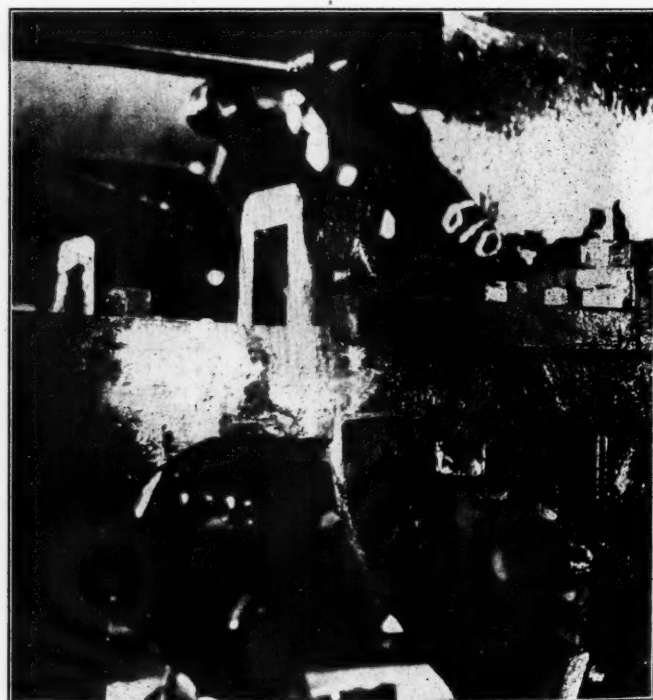


Preheating Forge and Bench for Making Welding Repairs

It was sent to the north shops on a night train and the iron flange which was broken in several places was repaired and the column was returned to Monett the following night.

NORTH SPRINGFIELD SHOPS

The north Springfield shops are largely used for the finishing or manufacturing of material and for freight car repairs. How-



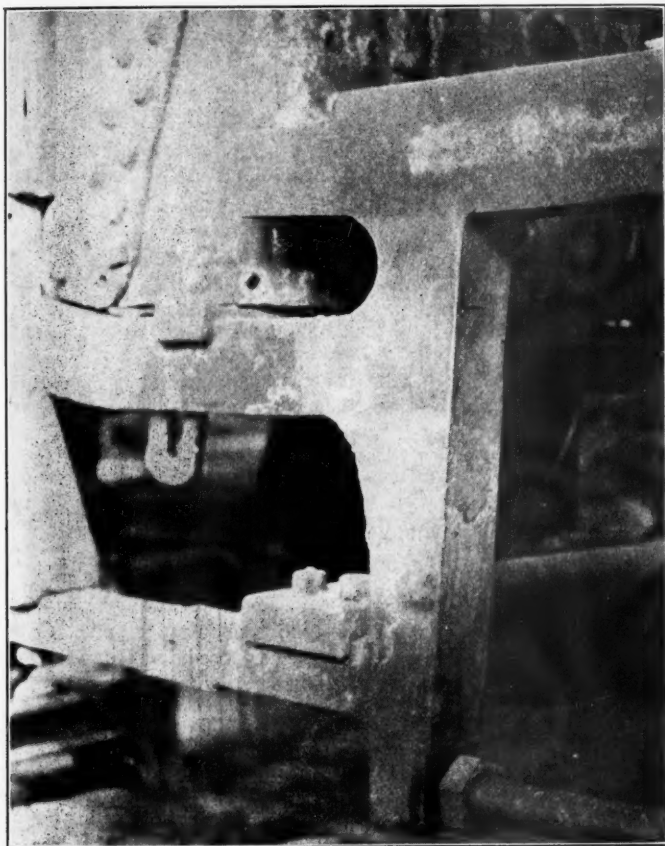
This Frame Worn to a Depth of 5-8 in. by a Spring Hanger Was Built up to Size by the Oxy-Acetylene Process

ever, several engines are repaired in the erecting shop each month and there is also a special department for overhauling work equipment and motor cars. Naturally, under these conditions, many possibilities are offered for the advantageous use of the oxy-acetylene apparatus. The greatest volume of this

work is in connection with the repair of freight car castings. The value in making repairs to broken or worn parts of the work equipment and motor cars can hardly be estimated, but is very great. Many of the parts for this class of equipment are not regularly kept in stock, and if the oxy-acetylene plant were not available extended and expensive delays for securing material would be unavoidable.

Wonderful results have also been obtained at the north shops in making repairs to machine tools and machinery. Following are a few instances of this sort:

Engine 1000 came into the shop for repairs to a cylinder. The planer upon which this work was to be done broke down. Under ordinary conditions it would have required from ten days to two weeks to secure a new part for the planer and the locomotive would have been held out of service for that length of time, although no repairs were necessary other than those to the cylinder casting. With the use of the oxy-acetylene ap-



Pedestal Jaw Broken Between the Top and Bottom Rail Which Was Welded by Oxy-Acetylene Process

paratus the planer was repaired and placed in service within 45 minutes.

The internal gear was broken on a power forcing press, two of the teeth being torn off. It would have required at least ten days to procure a new gear. With the oxy-acetylene apparatus the teeth were built up and the press was again in operation on the following day.

The housing for a large roll was broken. The factory was immediately telegraphed for a new part which reached the north shops six weeks later. Meanwhile the oxy-acetylene operator got busy and welded and replaced the housing within a day and a half. The new housing is still held in reserve.

A long hole of large diameter was being drilled through a locomotive trailer truck casting. There was only one drill of the proper size in the shop and it broke through the middle. In one and one-half hours it had been repaired with the use of the oxy-acetylene apparatus and was back in operation. This was several months ago and the drill is still working.

Repairs are made to brass, bronze, special alloy castings, and steel castings, as well as to those of cast iron. Important savings are made in repairing the cases for air motors and other of the smaller parts of these tools. Other interesting jobs which have been performed at the north shops are as follows: In a number of cases deck castings have been welded. A locomotive bell of a special composition which had become cracked was successfully welded without in any way affecting the sound qualities. Splendid results have been obtained in repairing steel

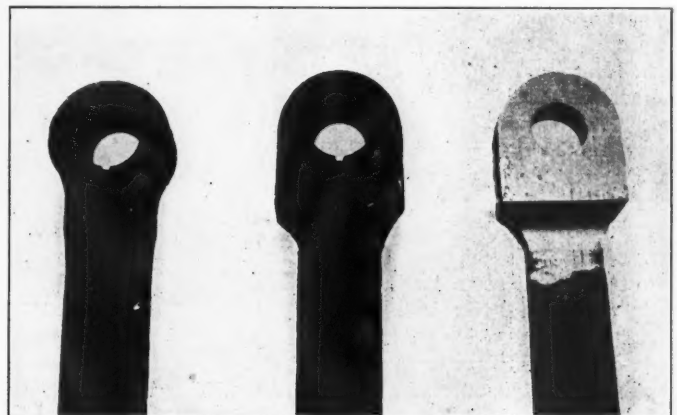


A Water Column and Spout Which Were Repaired by the Oxy-Acetylene Process

passenger coaches by cutting out worn parts of the roof, thus allowing new parts to be riveted in place. A cast steel frame on a six-wheel coach truck was broken on both sides. There were no extra castings of this sort in stock and the pieces were successfully welded together, resulting in a very large saving, as the steel castings would otherwise have had to be scrapped. Instead of drilling the cylinder saddle holes in a new smokebox they are burned through with the cutting burner. Large savings have been made in repairing injector castings which have been cut by the wind sheet.

Particularly important results have been gained at the north shops in welding cast steel bolsters. The average cost of these bolsters when new, allowing for their scrap value, is \$19.36; the average cost of making repairs to a large number proved to be \$2.46, a net saving per bolster of \$16.90.

Examples of savings such as mentioned above, might be multi-



The Ends of Side Rods are Reinforced by the Oxy-Acetylene Process

plied indefinitely, but those cited will give some idea of the adaptability of the oxy-acetylene apparatus for emergency repairs of all kinds, as well as for the routine work in a locomotive and car repair shop.

The installation of the Oxweld plants on the Frisco and the progress of the work in these plants has been carefully supervised by H. W. Jacobs, of the Oxweld Railroad Service Company, who was probably the first engineer to suggest the piping of oxygen and acetylene gases for this purpose in railroad shops in this country.

HARRY R. KURRIE

Harry R. Kurrie, general attorney of the Chicago, Indianapolis & Louisville, at Chicago, on September 4 was elected president of the company at a meeting of the board of directors in New York, to succeed Frederic A. Delano, who recently resigned to become a member of the Federal Reserve Board. Mr. Kurrie is 39 years old and is, therefore, one of the youngest railroad presidents in the country. He was selected by the executive committee which has had the matter under consideration since Mr. Delano's resignation.

Mr. Kurrie is a lawyer, and for the past 13 years has been connected with the legal department of the Monon; for the last four years as general attorney. Having previously been engaged in the private practice of the law he has never been directly connected with any other corporation than the Monon, and in his work in the legal department he has commanded the respect of his superiors for his character and ability and his unremitting industry.

In announcing Mr. Kurrie's election E. C. Field, vice-president and general solicitor of the road, gave out a statement in which he spoke of Mr. Kurrie as follows: "He is a man of character and deliberate judgment and his proficiency as a lawyer became well established throughout Indiana. He has always been a hard worker, has unusual capacity for the details of transportation problems and is now the most thoroughly equipped man for chief executive on the Monon road. He will have no outside matters to embarrass him and his sole ambition will be to make successful the property that has acquired the most enviable reputation under the splendid management of Fairfax Harrison, and later of Frederic A. Delano. Mr. Kurrie knows practically every man on the system and there will be no disturbance either in the policy of the road or its organization. The Monon is essentially an Indiana road, most of its mileage being in that state. Mr. Kurrie is the first Indianian to have executive charge of the property, and I predict his appointment will be more gratifying to our patrons than any other that has ever been made. He is a young man yet and he is a very sensible man. He will make as good a president as any railroad man in the world."

Mr. Kurrie was born in Orange county, Indiana, on April 26, 1875, of German stock, and although of recent years he has maintained a residence in Chicago, he has also spent much of his time on his farm at Paoli, Ind., his home town, and has always lived almost within sight of the Monon tracks. The Monon road was built through Paoli soon after he was born, and he has thus been constantly associated with it throughout his life and has felt a real attachment to the company. Since being connected with the road he has had various opportunities to accept other places at greater salaries, but has always felt a strong inclination to remain with the road. His early life was spent on a farm near Paoli; later he became a student in the State Uni-

versity at Bloomington, Ind., and he was graduated from both the literary and law departments. In June, 1895, he began the practice of law at Rensselaer, Ind., and on February 10, 1902, he was appointed assistant general solicitor of the Chicago, Indianapolis & Louisville, in Chicago. In January, 1910, he was promoted to the office of general attorney.

ENDING THE MILEAGE-BOOK DISCRIMINATION

[New York World]

The Pennsylvania and New England railroads which have announced increases in passenger rates are confining the advances to their mileage-books. If any change upward is to be made, and the commission has virtually sanctioned an upward change, this is the best way to go about it. A general advance in passenger rates would undoubtedly reduce passenger traffic. An advance in mileage-book rates alone should have slight effect in reducing traffic. There has never been any sound reason for this discrimination against single-ticket travelers. The wholesale and retail principle does not apply. While mileage is sold wholesale in the book form, its transportation is actually used retail by the buyer as he pleases, in time or place or distance, just as with the single-ticket buyer. He is as incalculable a traveling quantity to the railroad in the one case as in the other. The money of the hand-to-mouth buyer of transportation ought to be as good as that of the man who buys his transportation ahead of its use.

[Philadelphia Public Ledger]

The Interstate Commerce Commission is responsible for the proposed increase in mileage-book passenger rates. The commission is committed to the proposition that every branch of the railroad business should show a profit. . . . A 5 per cent increase in freight rates would have distributed the burden so widely that no one would have felt it. . . . But the extra cost of every mile one travels on mileage books will be considerably greater than the extra freight which

the railroad wished to charge on the pair of shoes that he wears. The traveler will feel the increased cost of each mile, but the increased cost of the shoes would not have been discernible. It is a beautiful theory that every branch of the railroad business should show a direct profit; but every practical man knows that the indirect profits of an apparently unprofitable branch of his business are sometimes so great that he would have to go into bankruptcy if it were not for them. It is the men traveling in the passenger trains who make the business that fills the freight cars. Theorists in Washington do not seem to be able to comprehend these simple business principles.

PORT DEVELOPMENT IN COSTA RICA.—The president of Costa Rica, subject to the approval of Congress, has signed a contract providing for the development of Port Tortuguero.



Harry R. Kurrie

Controlled Manual Block for Opposing Movements

A Short Two-Track Freight Railroad in New Jersey Fulfilling the Functions of a Three-Track Line

By C. C. ANTHONY

The Pennsylvania Railroad has recently installed on two miles of double track a controlled manual block system designed to permit movements to be made by signal indications in either direction on either track and to protect against opposing trains every possible movement from a yard or over a crossover near the middle of the section. The installation is on a part of the freight line connecting the four-track main line with the terminal yard on the Hackensack Meadows, near Jersey City. On account of the large number of both slow and fast freight trains passing over these tracks it was thought desirable to provide block signal protection and, at the same time, to provide for movements against the current of traffic by signal so that one train could be run around another in the section in question, without the use of train orders. It had been found necessary to make such movements frequently (on one occasion sixteen trains were run against the current of traffic in one day) for the purpose of getting trains of perishable freight into Jersey City for the New York market when slow freights ahead of them were blocking the normal track; getting fast freight, from Jersey City around slow trains that had pulled out of the Meadows Yard, and getting trains into the yard within the sixteen-hour limit.

For movements with the current of traffic the two-mile block

That is, trains move normally under the automatic block signal system varied by the use of a calling-on arm for movements past an absolute stop signal at the entrance of the first block; while, in the reverse direction, they move under the permissive manual block system. The layout of tracks and signals is shown by the right-line plan, Fig. 1. West of CG the tracks run through a yard and are not block-signaled; hence the absence of westward signals at that point.

In working out the system it was assumed that the rear protection to be provided should be the same as that afforded by the simple manual block system; that it would not be justifiable to complicate and increase the cost of the system for the purpose of making it necessary to secure a separate unlock for each of several successive trains in the same direction. The circuits and controlling devices are designed primarily to prevent the admission of opposing trains to a section under any circumstances. If, however, power-operated or electrically slotted signals are installed, it is a simple matter to provide a degree of rear protection that is not possible with the simple manual block system; that is, the movement of a signal from the caution to the proceed position may be controlled by all the track circuits in the section, so that a clear signal cannot be given unless the whole section is clear. And, as a matter of course, such a signal would

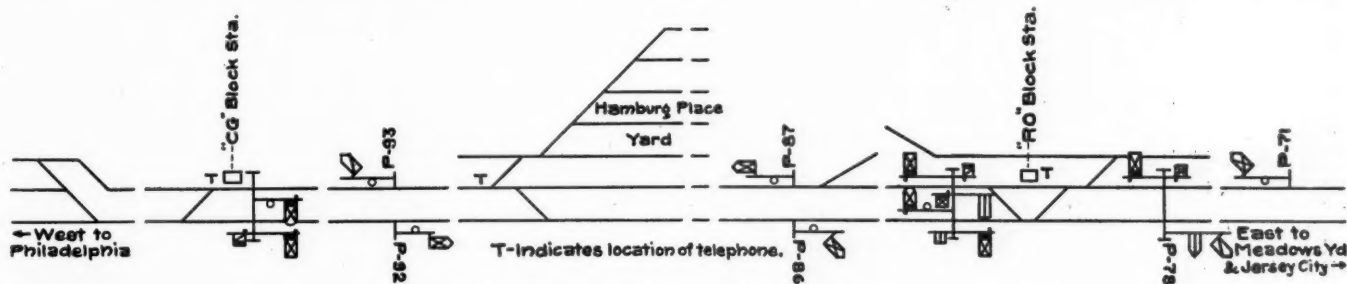


Fig. 1—Tracks and Signals on Freight Line

section is divided into three blocks by automatic signals. The signals governing entrance to the two-mile section in the normal direction are, however, necessarily absolute signals to hold trains when opposing trains are in the section. To enable trains to follow one another the same as they do under automatic block signals, each of these signals is provided with a second—"calling-on"—arm. Both arms must be horizontal when a train moving against the current of traffic is at any point in the two-mile section. When trains are moving in the normal direction, the top arm may be set at caution if the block extending to the first automatic signal is clear and that signal is at stop, or at proceed if the block is clear and the first automatic signal is at caution or proceed. If, however, the block is occupied (by a train that has entered in the normal direction), the top arm is held in horizontal position by track-circuit control and the calling-on arm can be set at caution to allow a second train to enter the occupied block.

For movements against the current of traffic it was not thought necessary to provide intermediate automatic signals and, on each track, the block extends the entire length of the two-mile section. Entrance to this block in the direction against the current is governed by a three-position signal which is, of course, locked in (absolute) stop position when trains are moving in the normal direction, but can be set at proceed for a movement in the reverse direction, if the block is clear; or at caution for a second train to enter the block occupied by a preceding train.

be made semi-automatic so that it would be set at stop by every train passing it, and manipulation of the signal lever for each train would be necessary. The signals of the installation in question are motor signals controlled in this way.

It is true that, if the system were designed for absolute blocking only, it might not be a difficult matter to arrange it so that a separate unlock would have to be secured for each train. But it is important to note that, to secure the full protection of the system, every train movement into a section should be made by signal indication, or by its equivalent, such as the unlocking of an outlying switch. If absolute blocking is provided for and if then, in practice, it happens rather frequently that freight trains are allowed, by caution card or train order, to pass stop signals for the purpose of following other freights in the sections, the checks applied by the system are ineffective in these cases; a card or order may be issued in error to admit a train against an opposing train. Therefore, if permissive movements are to be made even occasionally, the system should be designed so that proper signal indications can be given for such movements. To accomplish this in a simple way it is practically necessary that the apparatus be so arranged that an unlock, once obtained, can be held until the section is clear. The only occasion for admitting trains under stop signals should be when there is some derangement that prevents the clearing of a signal; or when a train must be admitted in the opposing direction to reach a disabled train; or when a train has to be run over the working

limits of a work train that entered the section in the opposite direction. In all such cases on the Pennsylvania the despatcher takes charge and issues the necessary orders, first assuring himself that any apparent derangement is not due to the presence of an opposing train in the section.

The novel feature of the system is the provision for control of movements into the section at outlying switches. The apparatus and the essential circuits are shown diagrammatically in Fig. 2. Readers who are not interested in these details will find the possible train movements and the protection afforded, illustrated by the diagrams in Fig. 3, which are explained farther on.

Fig. 2 shows a block section with two outlying switches, one controlled from each block station. For the control of an outlying switch the block instrument is made up of two manually operated electric locks, C and D, interlocked by mitered mechanical locking clearly shown in the figure. When the operating handles, c and d, of these electric locks are moved to the right or left, the lock segments, of course, rotate in the opposite direction; in the three conventional symbols for the circuit-controller contacts in each lock (shown below the lock) the lower ends of the contact arms are supposed to move in the same direction as the handle. The signalman at station A, to give an

of d to the right breaks connection between wires 7 and 8 so that the armature of D will fall, lock d against return to normal position and close a circuit from battery through wires 9 and 10 to the lever lock F, which then releases the signal.

When the signal has been cleared and thereafter returned to normal position, d may be moved to position MR to break circuit 9, 10, and lock the signal lever; but it cannot be moved farther until the train for which the signal was cleared has passed beyond switch b; then indicator E will clear and close circuit 1, 2, 6, 7, 8, thereby unlocking D. Handle d can then be moved to normal position, when it releases c, which is mechanically locked in position to the right when d is moved either to the right or left.

If B should now move c to the left he would close a circuit to unlock A, exactly the same as the one first described. This circuit, however, would not be complete so long as the train was on any track circuit controlling a relay h, i, j or I; (relay h controls indicator E which prevents the giving of an unlock, by B by opening the connection between battery and wire 1; while relay H, although similarly preventing the giving of an unlock by A, does not prevent the receipt of an unlock at that station because wire 4 goes directly to instrument C). Assuming that

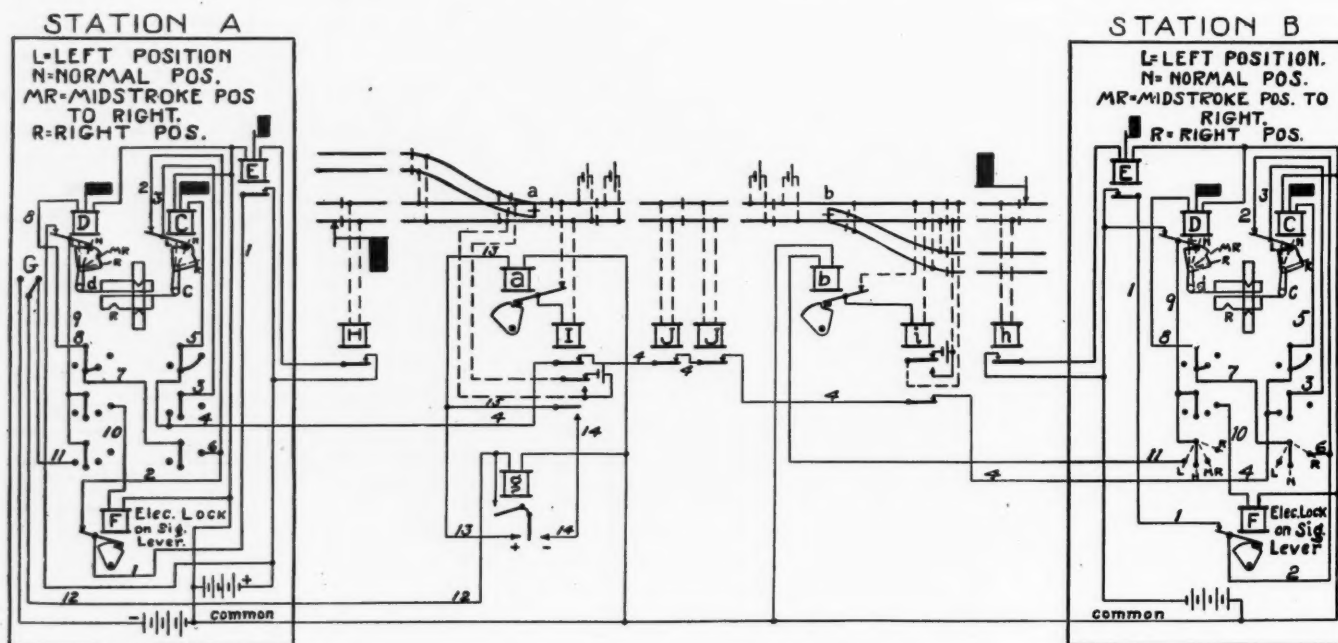


Fig. 2—Typical Diagram of Circuits

unlock to B, moves the handle c, of his block instrument, to the left. The circuit is then from battery (+) through contact of indicator E, which is controlled by the track circuits extending to a point just beyond outlying switch a; wire 1, contact of electric lock F, which is closed when the signal at A is locked in stop position; wire 2, armature contact of block instrument C, which is closed when the instrument is locked against a movement that would release the signal; wire 3, contact closed when c is moved to the left, wire 4 through contacts of track relays I, J, i, covering the middle portion of the block, between the outlying switches; normally closed contact of the block instrument at B, wire 5, electro-magnet C to common return. The signalman at B then moves his handle c to the right, thereby mechanically releasing the other part of his instrument, D, and closing the circuit from wire 6 to 7. The circuit from 4 to 5 remains closed so that after an unlock is received, the indicator of C will show at any time whether the portion of the block between A and b is occupied.

B is now ready to clear his signal. To do this he must move handle d to the right and this can be done only when indicator E is clear, the circuit being from battery at B through contact of E, wires 1, 2, 6, 7 and 8 to electro-magnet of D. Movement

there is a train on the siding waiting to pull out at a, the crew will report by telephone when the train moving from B to A passes. B may then give A an unlock. A will move handle c to the right but cannot move d to the right, so as to release his signal, because the circuit for unlocking D (1, 2, 6, 7, 8) is open at indicator E while the approaching train is between a and A. He is, however, free to move d to the left because it is mechanically released by c (moved to the right) and the electric lock of D is not effective against movement of d to the left but locks only against movement to the right or return from position MR to normal. Movement of d to the left breaks connection between wires 7 and 8 so that, when there is no train between A and a and circuit 1, 2, 6, 7, 8 is closed at E, the armature of D will fall. The same movement, the armature contact of D being closed, completes a circuit from battery through wires 9 and 11, circuit controller G and wire 12 to polarized relay g which closes a branch of the same circuit through wire 13 to the electric switch lock, a.

As the armature of lock A controls relay I and relay I controls the circuit of H, indicator E is open while the switch is unlocked and while a train pulling out is on the track circuit of relay I. It is therefore impossible, during that time, to move

handle d to the right to release the signal; and the train would be protected at A if it should make the move illustrated by case 4 or case 6, Fig. 3. Assuming that it moves toward B, an unlock cannot be received at B while it is between a and b; consequently an opposing train cannot be admitted to the block either by signal at B or by unlocking of the switch at b. After it has passed b an unlock may be received and used to let a train out of the siding at b but, as explained in the case of A, cannot be used to release the signal. A, however, still retaining the unlock obtained to let the train out at a, may, after this train has cleared the track circuit of relay I, move handle d to the right and give a caution signal to admit a following train.

If a train moving from B to A has to enter the siding at a,

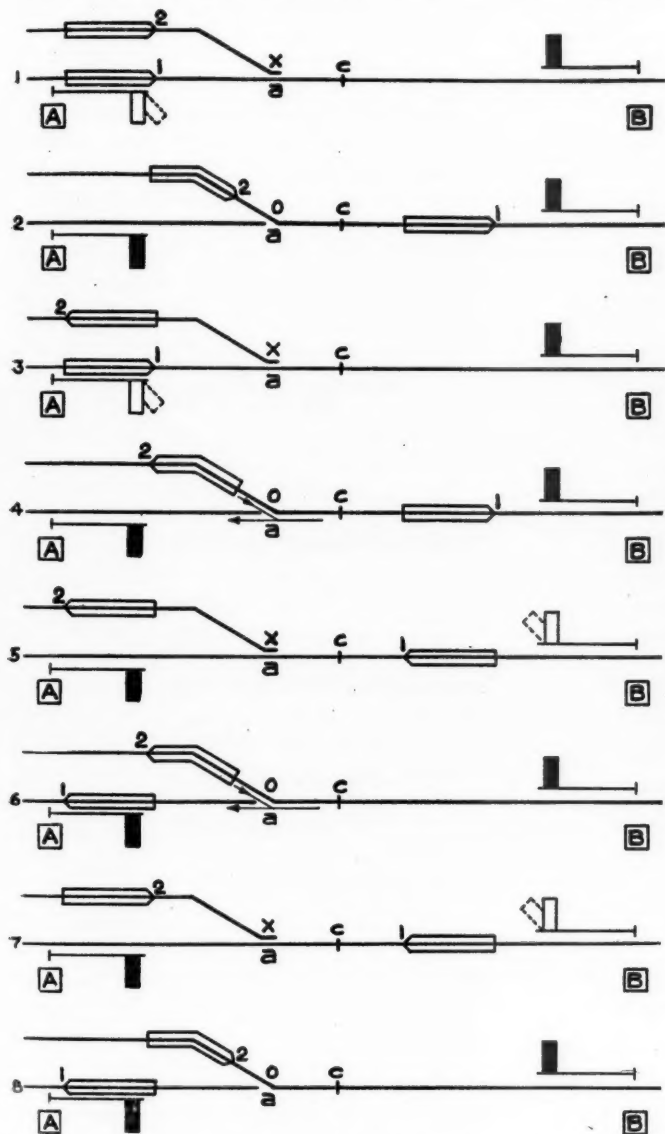


Fig. 3—Diagrams Illustrating Protection and Possible Train Movements

circuit controller G is moved to the left to close a circuit from the negative pole of a separate battery to relay g. This relay then continues the circuit through wire 14, back contact of relay I, wires 15 and 13 to the switch lock which may thus be unlocked when the train is shunting relay I. Obviously the switch could be unlocked in this way while a train was passing on the main track or while the track relay was open because of some defect. But it is equally obvious that, if electric switch locks are used, some provision must be made for unlocking switches at which trains have to enter sidings; the arrangement illustrated is reasonably simple and has been found satisfactory in practice. If a switch is normally used only for trains leaving the siding, the circuits are arranged as at station B.

There are various additions to these circuits where semi-automatic signals, electric distant signals, approach locking, etc., are installed; but the block circuits remain the same and, as the diagram shows, require but two line wires through each block and one additional wire for each outlying switch, extending from the switch to the block station from which it is controlled. Indicator E, however, requires a line wire if there is a semi-automatic distant signal between the block station and the farther end of the track circuit for relay I.

Turning now to Fig. 3, the results obtained in the way of protection and facility of movement may be explained with the aid of the diagrams; these show a block between block stations A and B, the signals governing entrance to that block and an outlying switch, a, controlled from block station A, with trains passing and meeting under various conditions. X indicates that the switch is electrically locked; O, that it is unlocked. Semaphore arms in solid black indicate that the signals are, for the time being, locked in stop position; arms in outline are free to

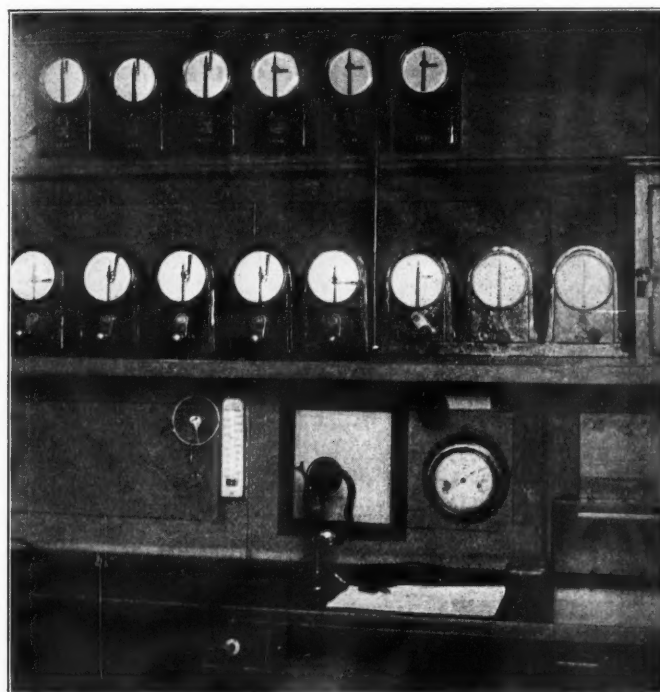


Fig. 4—Interior of R O Cabin

be set in caution position as indicated by dotted lines. The point c is the end of an intermediate track circuit beginning at the switch and extending 500 feet or more.

In case 1, train 1 has entered the block at A and switch a cannot be unlocked. When train 1 has passed c, as in case 2, the switch can be unlocked for train 2 to follow. Whether train 2 shall be allowed to follow permissively or shall be held on the siding till the block is clear, is a matter of manual block operation; but if it is allowed to follow train 1, it will be protected against opposing trains, by the signal at B, until it clears the block. In case 3 and 4 it is assumed that train 2 has taken the siding to meet train 1, but, for some reason, will have to back out at a instead of pulling through the siding and going out at the other end. Again the switch is locked until train 1 has passed c and may then be unlocked for train 2 to back out and proceed toward A. In this case the signal at A remains locked until train 2 clears. In cases 5 and 7 the switch is locked while train 1 is approaching from B, but may be unlocked as soon as train 1 has passed it, so that train 2 may back out and follow train 1, as in case 6, or pull out and proceed to B, as in case 8.

It is hardly necessary to say that, if two or more trains are in the block, the last train in must pass c, in cases 1 and 3, or a, in cases 5 and 7, before the switch can be unlocked. In case 2, as

soon as train 2 has passed c, the switch having been set and locked for the main track, the signal at A is free to be set at caution for a third train to enter the block at that point. Similarly in case 4, if, after train 2 has cleared at A, a third train should arrive at A before train 1 has cleared at B, the signal at A can be set at caution for this third train to follow train 1; and in case 8, after train 1 has cleared and train 2 has passed c, a third train may be admitted at A on a caution signal. In cases 4 and 6, however, the signal at B remains locked until train 2 clears the block; it is hardly practicable, without undue complication, to arrange the circuits so that the signal at B, in these cases, can be unlocked as soon as train 2 has started from a toward A (assuming that, in case 4, train 1 has cleared in the meantime). Nor is such facility of much importance in practical operation.

In actual operation there is, of course, an understanding as to the move to be made in each case; but it is obvious that, *so far as the signal system is concerned*, the unlocking of an outlying switch leaves a train free to enter the block and move in either direction, and must, therefore, be preceded by the locking of signals against other trains from both directions. It is found to be quite practicable, however, to release the signal at the block station from which the switch is controlled, as soon as the rear of a train that moves away from that block station has cleared a track circuit at a point about 500 feet from the switch, as in case 2, Fig. 3. It is assumed that, if the train stops on the main track for the switch to be set normal and then moves in the reverse direction, as in case 4, it will not clear the track circuit in question and will hold the opposing signal locked until it clears the block.

An indicator or electric signal might be used, instead of an electric switch lock, to govern trains leaving a siding, with practically the same circuits and operation. The electric switch lock requires means for unlocking the switch to allow a train to enter the siding, as explained in connection with the circuits.

Although the circuits and operation have been explained for the typical case of one or two outlying switches in the block—one controlled from each block station—the number of switches that can be controlled is not limited. In one block on another part of the Pennsylvania, there are four switches, all of which it was thought desirable to place under complete control because trains might occasionally clear the main track at any one of them. An additional section of the block instrument, with the necessary switch-lock and controlling circuits, is provided for each additional switch controlled from a given block station, and the same protection and facility are secured for movements into the block at any one of the switches as are obtained in the case of one switch controlled from each block station. In practice complete control is provided only at those switches at which trains are expected to clear the main track in normal operation. The switch of a short industry track, for example, is not electrically locked and the instructions prohibit the regular use of that track for passing of trains. If, in some emergency, an engine should get clear on such a track and allow other trains to pass, its return to the main track would be governed by train order.

An example of a switch not controlled is the one at the spur track near signal P87, Fig. 1; as there will practically never be any occasion for even an engine to get clear on this track, the cost of providing an electric lock fully controlled, as a part of the block system, would not have been justified. The crossover between main tracks, near Hamburg Place yard, is treated, with reference to each main track, as a connection between that track and a siding. Thus, if a train is on the westward main track waiting to cross to the eastward track, the crossover must be unlocked by circuits connected with the eastward track—the track that the train is about to enter; and, as already explained in the case of a siding switch on single track, these circuits permit the unlocking of the crossover only when conditions are such that a train may safely enter and move in either direction on the eastward track. The presence of the train on the westward track prevents the unlocking of the crossover by means of circuits connected with that track. Conversely the crossover must be unlocked by circuits connected with the westward track when a train is to cross to that track. The connection between the yard and the westward

track falls under the typical case of a siding connecting with a single-track line; the circuits are necessarily arranged, as explained in connection with Fig. 2, to permit the unlocking of the switches for a train to enter the yard.

The benefits derived from the system in this application to double track are the saving of the dispatchers' time that would have to be given to this section if movements against the current of traffic were frequently made by train order, and the facility for making such movements safely at a moment's notice whenever conditions permit, without the delays incident to the issue of train orders—a facility that means, assuming a certain use of the tracks against the current of traffic, the maximum capacity possible with such use of the tracks.

The same system is used on several sections of single track, among them two that lie between sections of double track. In one case, the first installation, the single track is about $8\frac{1}{2}$ miles long, divided into two blocks of $3\frac{1}{2}$ and 5 miles. There are passing sidings extending into the blocks from both ends of double track and a passing siding with crossovers at the middle block station. Each block station is an interlocking and a certain amount of benefit results, of course, from the saving of stops of trains that have to enter the sidings. Double track was thought to be urgently needed before the system was installed, seven years ago; from that time to the present there has been no serious difficulty in handling the trains on the single track, and second track, which would be quite costly, seems to be still some distance in the future. The latest installation has been made in connection with a section of new line about five miles long built to secure a better grade on a single-track division. Both the old and new lines are equipped with controlled manual block and the old line has one passing siding and one station spur track in the block. In this case passenger trains and local freights in both directions have to run over the old line on account of intermediate stations. The installation permits the use of both lines to the best advantage for the meeting and passing of trains, and at the same time gives some relief to the dispatchers on a very busy single-track line.

The system described is the subject of a patent issued to the writer.

A QUARTER CENTURY OF DEFICITS IN PASSENGER SERVICE

The Bureau of Railway News and Statistics has issued the following:

Twenty-one years ago more than one-third of the railway mileage of the United States was carrying its passenger business at a loss. Taken in conjunction with the recent decisions of the Interstate Commerce Commission in both eastern and southwestern rates cases, finding present state-enforced passenger fares unprofitable and ruling that the railways need not apply to interstate traffic the excessively low rates forced by state legislation, figures taken by the Bureau of Railway News and Statistics from early reports of the commission show that at least for a quarter century the passenger traffic of the United States has either resulted in actual loss to the carriers performing the service or has failed to contribute its proper share to railway revenues.

The commission's recent decision, therefore, is seen as the result not of a recent development in passenger traffic, but of the fact that American passenger fares never have been adequate to the expensive quality of service demanded by Americans.

For six years after its creation the commission compiled figures showing not only the average revenue received by the railways for carrying one passenger one mile, but also the average cost of performing the service. For these six years the revenue, cost and difference in cents per passenger mile are as follows:

| Year | Revenue | Cost | Difference |
|-----------|---------|-------|------------|
| 1888..... | 2.349 | 2.042 | .307 |
| 1889..... | 2.165 | 1.993 | .172 |
| 1890..... | 2.167 | 1.917 | .250 |
| 1891..... | 2.142 | 1.910 | .232 |
| 1892..... | 2.126 | 1.939 | .187 |
| 1893..... | 2.108 | 1.955 | .153 |

Taking these costs of a quarter century ago it may be seen how slight could be the profit today, when the average revenue has declined to 2.01 cents per passenger mile, forced upon the railways by state legislation, while all elements of cost, particularly labor, fuel, equipment and terminal facilities, have risen enormously.

By 1893, in fact, when the commission abandoned the computations, the railways in 4 of the 10 territorial groups were shown to be carrying passengers at a loss. The deficits for these groups for the several years follow in fractions of cents per passenger mile:

| Group | 1890 | 1891 | 1892 | 1893 |
|------------|-------|-------|-------|------|
| V | *.388 | *.217 | *.089 | .146 |
| VII | *.063 | .093 | .283 | .151 |
| VIII | .026 | .176 | .212 | .250 |
| IX | .153 | .057 | .133 | .050 |

*Net profit.

Thus in 1893 there was an average loss for every passenger carried by the railways of Georgia, Florida, Alabama, Mississippi, Tennessee, Kentucky, Louisiana, Arkansas, southern Missouri, Oklahoma, Indian Territory, Kansas, Nebraska, western North and South Dakota, Montana, Wyoming, Colorado, eastern New Mexico and Texas. These railways, paying more to furnish the passenger service than they earned from the service, operated 58,843 miles of the 169,780 for the entire country, or almost 35 per cent.

Today American railways furnish the highest class passenger service in the world at a price as low or lower than that charged by any of the railway systems of Europe in their first class tariffs, even disregarding the much greater value of the American cent in these foreign countries. The comparative cheapness of American travel is shown more truly in the length of journeys purchasable by an average day's labor, the wage taken being that of railway employees:

| | Av. wage per day | Av. recls. 1st class per passenger mile | First class for day's labor |
|---------------------|------------------|---|-----------------------------|
| Switzerland | \$0.99 | *3.26 cents | 30.4 miles |
| Great Britain | 0.93 | *3.00 cents | 31.0 miles |
| Italy | 1.15 | *3.52 cents | 32.7 miles |
| France | 0.87 | 2.12 cents | 41.0 miles |
| Belgium | 0.85 | 2.01 cents | 42.1 miles |
| Germany | 1.35 | 2.93 cents | 46.1 miles |
| United States | 2.49 | 2.01 cents | 123.9 miles |

*Tariff rate.

One day's labor in the United States purchases thus almost three times as much travel as would the same labor traveling first class in the nearest European competitors above.

TARE WEIGHTS AND REFUSE*

BY ARTHUR HALE

General Agent, American Railway Association

It was abundantly proved by the recent investigation into railroad weighing by the Interstate Commerce Commission that on an average the tare weights marked on cars were higher than the actual weights of the cars. This is because cars on an average decrease in weight by wear, rust and general decay, and gradually fall below the weight with which they were originally marked.

It seemed to surprise the commission and many of the shippers to find that this situation is an advantage to the shipper. But there is no doubt that whenever the tare weight of a car is used in arriving at the net weight, and this tare weight is too large by, say, 1,000 lb., the railway is moving 1,000 lb. of freight free for the shipper.

Of course, there are cases when the tare weight is too low. Sometimes cars are repaired so thoroughly that they weigh more than they did, and sometimes the addition of new wheels or other new parts to cars increases their weight; but the railways are growing more and more careful to reweigh cars after repairs are made and there is not near the difficulty with this that there used to be. There is still difficulty when refuse is left in a car and when the car with refuse in it weighs more

than the stenciled tare weight upon it. This is something we will return to.

The important point is that cars grow lighter, and as they are growing lighter the light weighing of cars should be renewed from time to time to prevent losses by the railways in carrying freight.

It was testified in this investigation by the superintendent of the largest weighing association that in light weighing over 30,000 cars under the old rule, it was found that the tare marked on 73 per cent of the total exceeded the actual tare by an average of 1,008 lb. per car. Let us see what this means in freight money. The last statistics of the Interstate Commerce Commission show that lumber pays the railways a little over 7 mills per ton per mile. This means that if one of these cars, whose marked tare weight was 1,000 lb. too much, was loaded with lumber for a thousand mile trip, the railway makes a gift to the shipper of \$3.51, which is enough to clean, weigh and mark the car several times.

The average rate on bituminous coal is 4.7 mills per ton per mile. Coal does not move as far as lumber, but many cars of coal move 500 miles, and on every such trip we are presenting the shipper with \$1.17 whenever we use one of these cars.

The situation has undoubtedly improved since the investigation. The rule has been improved; the railways are weighing their cars more frequently and it may be fair to presume that the old status has been so far improved that we should use on an average 500 lb. instead of 1,000 to indicate the difference in light weight of cars which should be weighed. Taking the average rate of freight, $7\frac{1}{2}$ mills per ton per mile, and the average trip of a ton of freight, 254 miles, we are on the average presenting each shipper 47 cents for each load if we neglect the light weighing of cars. The average freight car makes so many trips per month that it is an immediate economy to see that it is light weighed in accordance with the new rules. It may be safely stated that millions of dollars are being saved to the railways by this more frequent weighing and marking of their cars. But this is not a question to handle by averages. The average car is probably all right, but here and there a car will be found which has not been weighed for several years and is dried out, so that it is 1,000, or even 2,000 lb. light. Whenever a shipper loads a car like this, the railroad man responsible therefor may be absolutely certain that he is going to charge the shipper less freight than he should, and with a very old car and high class freight this may run up to \$10 or \$20 for the trip, according to the freight rate per hundred.

This weighing of a car rests primarily with its owner, but cars are away from home so much now that liberal provisions have been made to encourage railways to weigh foreign cars. The rules provide for the light weighing of wooden cars every two years and steel cars every three years, and any railway finding a foreign car on its line which has not been light weighed as per the rule can weigh the car and make a charge against the owner of \$1 for the work, which charge is increased to \$1.25 in the case of stock cars.

We understand that at points where a large number of empty foreign cars are handled, railways can make very good money by systematically examining and reweighing foreign cars; and this is as it should be, because in practice the railway which bills out the lading of one of these light cars not only loses a portion of its own revenue, but compels the other railways which move the car to lose a portion of their revenue as well.

I know from experience how difficult it is to get cars regularly light weighed and marked. In times of car surplus the demand for economy is such that it is sometimes difficult to get proper force assigned to this work; but when it is fully understood, not only by the traffic department, but also by the transportation and mechanical departments that every time the marked tare weight is reduced to the true figure there is an important increase in the freight earnings, the difficulty of getting the work done is very much lessened; and this paper is written chiefly with the idea of getting this important question

*Published in the Proceedings of the St. Louis Railway Club.

before the transportation people who arrange to have the cars light weighed, and the mechanical people who have to look after the marking of the car after it is light weighed.

The moment that it is generally understood that the reweighing of the old car is likely to bring an immediate and lasting reward in freight revenues, the difficulties in securing this light weighing will be diminished, even in hard times.

There is great difficulty too in getting cars light weighed when they are in demand. It seems hard to make a shipper wait while cars are being light weighed and remarked, but on the other hand it is very unfair to the railway to expect it to continue to use cars which are so marked as not to give full freight revenue.

This is one of the many things where railroad clubs, including as they do members of all departments, can help to improve railway practice. Normally the transportation and mechanical railroad men know little about freight rates, and when the traffic men are brought into contact with them the traffic men can tell them readily what rates are in effect on the principal commodities weighed on track scales; and they can work out together the actual economy in securing true weights on the freight which they are actually handling. If, for instance, there is a 10-cent rate on some iron pipe which is being shipped and the only car available is one whose light weight has not been renewed within two years, the agent can be pretty nearly sure that \$2, or even \$3 freight money can be saved to the company if that car is light weighed before shipment. This is also a matter of great importance to shippers who sell their goods on railroad track scale weights. If too high a tare is used they are going to be paid for less freight than they ship.

There is another way to look at this question, and here the yardmasters and agents can be especially useful to the railways. The marked tare is an important thing when cars are weighed on track scales, but not when cars are not weighed on track scales. It makes no difference to the railways what the marked tare is on cars loaded with warehouse freight, or on cars loaded by shippers with freight which moves under weight agreements. When it is impossible to get all cars light weighed to date, agents and yardmasters can do a great deal by using the cars with the old light weights in business where the tare weight is not a matter of importance.

There is a matter related to this on which the shippers can help the railways a great deal and where the railways can also help themselves, and that is the question of refuse in cars.

Under the law, consignees should unload *all* their freight, and this means they should not leave refuse in the cars, more especially when that refuse is incidental to that particular load of freight. Our present difficulty, however, in trying to get the consignees to clean out cars is that this rule has never been generally enforced, especially with open cars. Further, the railways, themselves, are not guiltless in this matter, and they do not always clean out the cars which they unload themselves.

It is true, as above, that a consignee ought to clean out his car, but on the other hand the railway ought to furnish a shipper with a clean car. The case is complicated where a consignee reloads a car and fails to clean it out before it is reloaded, and frequently a consignee objects to cleaning out the car after he has unloaded it because he believes it contains refuse from a prior carload.

This state of things was fully exploited in the Weighing Investigation, and it was represented chiefly as a hardship on the shipper who might be called upon to pay freight on refuse left in the car by some one else. But the investigation did not fully develop another point, which is that the railways are now hauling about in their cars an amount of refuse so great in the aggregate that it must make some increase in their cost of operation. It is by no means infrequent, when cars of coal are unloaded by hand, to leave in the bottom of a car, and especially in the hoppers, slack coal and slate weighing 1,000 lb. or more. If 40 such cars get into one train of empties, it would cost the railway just as much to haul those 40 cars as it would to haul 41 really clean cars.

I see no way in which we can get definite figures on this subject, but the expense is undoubtedly there, and I believe that this would justify railways in spending more money than they do in cleaning out cars. If the railways will get their cars cleaned, I think it will be practicable to take the next step which will be to insist on consignees cleaning out cars, or charging them with the expense of such cleaning.

Can we not then conclude that there is more than one reason why the railways should see that their freight cars are clean and that the tare weight marked upon them is kept up to date? Not only will it pay the railways to do this, but it is the only honest thing to do.

EXPRESS COMPANY PROFITS NEAR VANISHING POINT

The Bureau of Railway News and Statistics has issued the following:

"With above 4,000 more miles of railway covered by their services 11 express companies operating in the United States during 10 months of the last fiscal year experienced a loss of 85 per cent in operating income. Official figures just published by the Interstate Commerce Commission show that for the 10 months to April, 1914, operating income for these 11 companies was \$628,487, only 15 per cent of the operating income for the corresponding period in the year before, or \$4,231,465.

"So drastic an exhibit as this raises the question before the American people whether they desire to see the express business wholly taken from private management and given entirely to the government through the parcel post. The showing is the direct result of the immense deflection of tonnage formerly carried by express to the parcel post, which in its competition for the business has enjoyed the overwhelming advantage of being able to increase its tonnage steadily through raising of the weight limit on parcels admitted to the mails while refusing with impunity to bear the increased expenses entailed, as would be necessary for a commercial enterprise, by withholding from the railways increased remuneration to cover the heavier work of carrying the enlarged mail tonnage. At the same time rates on the traffic left to the express companies have been cut 16 per cent.

"In gross receipts from operation for the 10 months, due largely to these influences, there was a loss of more than \$8,000,000. Payments to the railways for their service in the express business consequently fell more than \$3,000,000, while the tonnage which would have saved this revenue for the carriers as express was carried by the same railways without pay in mail cars. Operating revenues of the express companies thus fell \$5,000,000, while a reduction of only \$1,500,000 in expenses left a loss in net of \$3,500,000, which was aggravated by an increase in taxes.

"For April alone, due to the same conditions, operating income fell from \$437,826 in 1913 to \$48,747 in 1914.

"The figures for the ten months and for April are as follows:

| Ten months— | 1914 | Loss |
|-----------------------------|---------------|-------------|
| Mileage | 303,986 | *4,213 |
| Gross receipts | \$132,646,163 | \$8,382,778 |
| Express privileges—Dr. | 66,413,551 | 3,266,223 |
| Total revenue | 66,232,612 | 5,116,555 |
| Expenses | 64,376,816 | 1,581,227 |
| Net revenue | 1,855,796 | 3,535,328 |
| Taxes | 1,227,309 | *67,650 |
| Operating income | 628,487 | 3,602,978 |
| April— | | |
| Gross receipts | \$12,839,513 | \$970,175 |
| Express privileges—Dr. | 6,475,442 | 373,537 |
| Total revenue | 6,364,071 | 596,638 |
| Expenses | 6,185,416 | 226,738 |
| Net revenue | 178,655 | 369,900 |
| Taxes | 129,908 | *19,180 |
| Operating income | 48,747 | 389,080 |

*Increase.

"Of the 11 companies covered by the official figures, five reported operating deficits for the 10 months. One of the largest express companies alone during that period took in \$466,258 less than it paid out to operate, and after paying taxes reported a deficit of \$635,657 for the ten months' operations.

KANSAS CITY RAILROAD COLLECTION BUREAU

The railways entering Kansas City have organized the Railroad Collection Bureau of Kansas City, which began business on September 1, for the purpose of making joint collections of freight bills for all roads. The bureau is operated by the credit officers of the Kansas City lines under the supervision of an executive committee of the Credit Officers' Association. The expenses will be apportioned monthly to the lines according to the number of bills and the amount of money collected.

All freight bills, except the following three classes, are to be sent to the bureau for collection: 1. Bills collected in advance of delivery or forwarding of freight, known as counter-collections. 2. Bills covering freight interchanged with other lines. 3. Bills covering livestock collected by the Kansas City Stockyards Company. Fourteen collectors are employed and the cities of Kansas City, Mo., and Kansas City, Kan., are divided into districts with one collector assigned to each district. Each local freight office lists in numerical order bills for delivery to the bureau on a form made in duplicate, the original to be received by the bureau and returned to the local office, and the duplicate to be retained by the bureau. As fast as the bills reach the bureau they are to be charged to the collectors and distributed in cases provided for the collectors in the order of the names of the payees. Each collector gives a receipt for all bills received by him. The bills for collection turned over to the bureau are to consist of the original freight bill, cashier's memorandum, and, when receipt from consignees for freight is desired, a form of receipt, and all parts of each bill are to be attached together. Each collector is to make a list of the bills collected by him and balance them with the checks and cash collected, turning all in together with the cashier's memoranda of bills collected.

The bureau is to make a list daily of all bills collected for each line, separating them into the following classes: Inbound, outbound, switching, demurrage and storage, using a form which each line may use as a loose leaf sub-cash book. In case exception is taken to any bill the collector is required to obtain a written statement of the exception, and such statement and all parts of the bill are to be returned to the local office and a receipt taken for them. When correction has been made it is treated as a new bill and will take the regular course.

The manager of the bureau is required to deposit daily the full amount of cash collected for all lines and to draw a check daily in favor of each line for the full amount of the collections made for it, and will make such disposition of the same as the proper officer may direct. Each line is to designate the name of some officer or a bank to whom checks shall be made payable and the bank acting as depository for the bureau is instructed not to pay any checks drawn in favor of any one else. The manager of the bureau is authorized, and it is his duty to check the local offices to prevent bills being sent direct to patrons for collection. All bills are to be receipted in the name of the bureau manager.

Prepaid bills are considered as due and payable upon presentation after loading or forwarding of freight. A reasonable time, according to conditions surrounding the business, with a maximum of one week, is allowed for checking, auditing and payment of bills.

In case a patron refuses or neglects to pay bills according to these conditions the manager is authorized to call upon him and in a diplomatic way, without embarrassing any line, to endeavor to arrange to have bills paid satisfactorily. If such arrangements cannot be made the manager is to notify each agent that the patron expects the railroad to discriminate in his favor, and payment of bills in advance of the delivery of freight will be required till the manager of the bureau can reach an understanding with him and get him to pay his bills promptly. No credit is to be granted by any line until the manager shall have made a report favorable to the applicant, and new applications for credit are to be referred to the manager, who, after investi-

gating the financial standing of the applicants, their proposed plan of making payment, etc., is to report to each agent.

The force of the bureau includes about 25 people, a manager, cashier, chief accountant, stenographer, 5 adding machine operators, 14 collectors, and a messenger. The plan of the bureau was recommended by a committee of the Kansas City Local Freight Agents' Association, which compiled figures showing that the total number of bills collected for all lines monthly would amount to 357,595, and that the total amount of money collected by all lines monthly amounted to \$2,792,000. It was estimated that a considerable saving would be made in the cost of collections, as well as in the efficiency of collection, and that the plan would promote the convenience of both the railways and the shippers, as the latter would have to make out but one check a day for all lines, instead of making separate payments to the different lines. R. P. Isitt has been appointed manager of the bureau.

PROGRESS ON VALUATION WORK

The following statement has been issued by Thomas W. Hulme, general secretary of the Presidents' Conference Committee on Valuation on the Developments in Connection with Federal Valuation during July and August:

"A. W. Newton, general inspector permanent way and structures of the Chicago, Burlington & Quincy, was elected a member of the engineering committee, and J. F. Cleveland, land commissioner of the Chicago & North Western, was elected a member of the land committee, western group, to fill the vacancy caused by the resignation of E. C. Carter; D. W. Gross, valuation engineer of the Atlantic Coast Line, was elected a member of the engineering and land committees, southern group, to fill the vacancy caused by the resignation of Robert Scott.

"The engineering land and accounting committees met during the first week in August. The engineering and land committees will hold their next meeting during the third week in September; the accounting committee will meet in September, at a time not now determined. Special consideration was given at these meetings to the subjects of depreciation, abandoned property, and transportation charges for men and material in estimating the cost of reproduction and for addition and betterment work as provided from July 1, 1914, in the new accounting classification of the Interstate Commerce Commission. These subjects are to be further considered at the meetings in September, at which the equipment officers, selected to aid the engineering committee are expected to be present. The Land Committee is giving consideration to the proper scheduling of land acquisitions (see circular issued by the general secretary on August 10, 1914).

"On June 25 there was issued from the office of the general secretary a circular communication in explanation of the mechanical process for reproducing maps on tracing cloth as contemplated in the government map order.

"Referring to the circular communication of May 9, 1914, with reference to transportation of government employees, the sundry civil appropriation bill, as amended in the Senate, and finally passed, contained the following provision with reference to transportation, which materially differed from the form in which the legislation was introduced in the House:

It shall be the duty of every common carrier by railroad whose property is being valued under the act of March first, 1913, to transport the engineers, field parties and other employees of the United States who are actually engaged in making surveys and other examination of the physical property of said carrier necessary to execute said act from point to point on said railroad as may be reasonably required by them in the actual discharge of their duties, and also to move from point to point, and store at such points as may be reasonably required the cars of the United States which are being used to house and maintain said employees; and also to carry the supplies necessary to maintain said employees and the other property of the United States actually used on said railroad in said work of valuation. The service above required shall be regarded as a special service, and shall be rendered under such forms and regulations and for such reasonable compensation as may be prescribed by the Interstate Commerce Commission, and as will insure an accurate record and account of

the service rendered by the railroad, and such evidence of transportation, bills of lading, and so forth, shall be furnished to the commission as may from time to time be required by the commission.

"It is my understanding that government employees will purchase tickets and pay tariff charges for transportation of their outfits and supplies in regular trains, but that where a special service is provided by the carrier under survey, said carrier should, pending the determination by the commission of the 'reasonable compensation' for said special service, render the same at the request of the government district engineer.

"The general secretary expects to issue in September a circular communication for the assistance of carriers in determining what shall be classified as abandoned property and advising of the importance to the carriers in preparing the information contemplated by the order. It is believed that an extension of time beyond February 1, 1915, can be secured to prepare the detail information required by the order, but the list and general statement of the carrier's claim should be filed by February 1, 1915.

"The commission adopted on June 25, 1914, effective July 1, 1914, 'Regulations to Govern the Recording and Reporting of all Extensions and Improvements or other Changes in Physical Property of every Common Carrier,' but has not promulgated up to this time the forms upon which to make the reports. It is, however, to be noted that, by the terms of the order, carriers which are not inventoried as of June 30, 1914, are only required to keep and not report the detail of what is commonly designated as addition and betterment records. It is possible that there may be further conferences with reference to the form of these reports between the accounting committee and the division of valuation. As this order is drawn particularly to enable the commission to keep up to date, as required by the valuation act, inventory of the property of each carrier, it is of importance to the carriers that they should see that the record is kept of all quantities and elements of cost of each improvement, so that there may be no failure to include in the additions to the inventory all proper charges.

"The Interstate Commerce Commission on June 25, 1914, adopted an order providing for the inventorying of materials and supplies as of June 30 of each and every year beginning June 30, 1914. It is the understanding of the general secretary that this order is intended to apply to the verification of the balance sheet account 'materials and supplies' and that it is not intended to apply to other items of a movable nature which are not embraced in said account.

"The division of valuation of the Interstate Commerce Commission has created a cost data bureau under the supervision of M. A. Zook, resident engineer. Our engineering committee has expressed its willingness to co-operate with the government in the gathering, preparation, and consideration of such data and has tendered its services through the group engineers.

"The general secretary desires to issue as of October 1 a statement showing the progress of valuation work on all railroads, and therefore has made a request that each railroad should send him by September 21 advice as to the progress of the government work on its lines, and, also, information as to the work that has been done by each company in preparation for the government work."

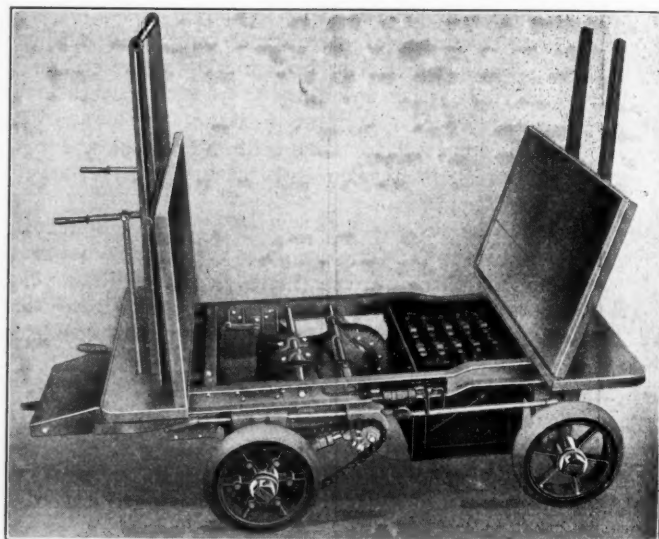
STORAGE BATTERY TRUCK FOR RAILROAD STATIONS

A storage battery electric truck for use in and about railroad stations, industrial plants, etc., has been developed by the Electromobile Company, St. Louis, Mo. Three types are built, each having a carrying capacity of 2,000 lb. and a tractor capacity ranging from 5,000 lb. to 8,000 lb. Type A is capable of speeds up to 10 miles per hour, type C up to seven miles per hour and type E up to five miles per hour.

The truck is operated by a storage battery which is mounted under the platform in a cradle hung between the side frame channels. The motor is hung upon a shaft extending across the frame and drives the countershaft through a differential

by means of a Morse silent chain. The countershaft is supported in three hangers swung from a second shaft extending across the frame. These hangers are in two parts to facilitate the removal of the countershaft, and are equipped with S. K. F. self-aligning ball bearings. Large sprockets bolted to bosses cast on the spokes of the two rear wheels are driven by chains from smaller sprockets on the ends of the countershaft. Independent adjustment of the side chains is effected by means of radius rods between the axle and countershaft hangers, the bearings maintaining proper alignment without strain on the countershaft.

Malleable iron pedestals of strong construction are riveted to the side frames of the truck over each axle. Spiral steel springs are placed in these pedestals and supported on the axles, the pedestals being closed at the bottom by means of plate binders which hold the body of the truck firmly upon the axles. The front axle is of I-beam section with steering knuckles on each end. A steering rod connected to one of the steering arms extends to the opposite end of the truck where it is operated by means of a lever having a vertical movement, through a bell crank and a vertical rod extending through the floor of the truck. This lever and the controller handle are pivoted on a shaft which is supported by malleable iron uprights riveted to the frame. A foot pedal conveniently



Storage Battery Truck, Showing Motor and Transmission Suspension

located on the operator's platform controls the band brake upon the drum of the differential. Standing on the pedal pushes open a spring which normally sets the brake, and closes the battery switch in the controller. Raising the foot from the pedal cuts off the current and sets the brake. The pedal is locked in this position until the controller handle has been brought back to its neutral position. When the truck is running the speed may also be regulated by raising or depressing the pedal slightly. This effect is produced by means of electrical contacts controlled by the pedal.

Ample battery capacity is provided for a full day's work on one charge without changing the battery. The wiring arrangement is such that a maximum capacity fuse located directly in the battery circuit is removed when recharging, thus making it impossible to start the truck while the batteries are charging. If 24-hour operation is desired the battery may be readily lifted out of its cradle and a fresh one inserted.

The trucks are regularly equipped with wheels 20 in. in diameter over the tires, which are of solid rubber. The platform stands 22½ in. high and has a width of 40 in. The length of loading space varies from 6 ft. to 7 ft., type A having the longest platform and type E the shortest. The trucks are designed to be operated by ordinary laborers and will handle loads on 30 per cent grades.

General News Department

The annual convention of the Veterans' Association of the New York, Chicago & St. Louis was held on September 5 at Cleveland, Ohio.

The four arbitrators who have been selected in the western enginemen's and firemen's wage controversy have not as yet agreed on the fifth and sixth members.

The Pennsylvania, in pursuance of its retrenchment policy, announces that 68 trains are to be discontinued on the lines east of Pittsburgh and Erie, September 15.

The Lake Shore & Michigan Southern has asked the approval of the Ohio Public Utility Commission for a demurrage rule to provide for an increase from \$1 to \$2 per day on refrigerator cars.

The North Dakota board of equalization has declined to adopt recommendations of the state tax commission to greatly increase the assessed valuation of railroads in the state. The board expressed the opinion that the present assessments are on a basis of equality with assessments of other kinds of property, and only allowed increases on some branch lines on which improvements have been made. The total assessment of railroads for the state is \$45,422,000.

A passenger train of the Grand Trunk was boarded by two masked robbers near Detroit, Mich., on the night of September 5, and a number of passengers in the parlor car were made to give up their valuables. A passenger who refused to obey the orders of the robbers was shot, probably fatally, and they also wounded another passenger. After the shooting they escaped from the train, which was running at low speed. The whole affair lasted only two or three minutes.

Most of the divisions of the National Railways of Mexico have now been reopened, but there is such a shortage of cars and engines that shippers are meeting with difficulty in having their transportation orders filled. Through traffic between the United States and Mexico is also inconvenienced because there is no through billing. It seems likely that it will be many months, even with internal affairs in Mexico undisturbed, before the enormous amount of equipment that was destroyed during the war can be replaced and traffic put on a normal basis.

The Mexican Northwestern has let the contract for restoring the Cumbre tunnel, which was destroyed by Mexican bandits some months ago. At present the tunnel forms a complete blockade, and there can be no through travel on that road between Juarez and Madera. All of the timbers in the tunnel were burned, and in many places the sides caved in. It is estimated that it will take five months to clear and re-timber the tunnel. As soon as the line is reopened the large lumber mills at Pearson and Madera, which are owned by the same British interests that own the railroad, will be put in operation.

The governor of Massachusetts, acting under a special act of the legislature, has appointed the "Western Massachusetts Transportation Commission" to study the general subject of transportation throughout the western part of the state. The chairman is Louis C. Hyde of Springfield. The studies of the committee will have to do especially with the question of electric lines to small towns, in the hills, which now have no railroad connection. The New York, New Haven & Hartford, under President Mellen, secured control of most or all of the existing electric lines in western Massachusetts, and had planned a number of new lines. It is the failure of these plans which has led to the present action of the legislature. The special commission has an appropriation of \$10,000 for its expenses.

The Salt Lake division on the northern district, the Stockton division on the southern district and the Sacramento general shops have won the 1914 safety banners awarded annually by the Southern Pacific for sending in the largest number of practicable suggestions for safety and the elimination of carelessness and

hazardous conditions and practices. Almost without exception there was a fine increase in the total number of suggestions made for the year ended June 30. For the Pacific system over 50 per cent more suggestions were received this year compared with 1913 and over 81 per cent more of them were found practical. There was an improvement of over 108 per cent in the number of practical suggestions per 100 employees in the service. The Shasta division ranked second on the northern district and the San Joaquin second on the Southern district. The cost of improvements made as a result of these suggestions this year amounted to nearly \$130,000, with pending expenditures for adopted suggestions approximating \$160,000.

Sweetness Long Drawn Out

The Mobile & Ohio lately moved a trainload of 17 tank cars loaded with Cuban black strap molasses destined for East St. Louis. Another tank steamer with a load of this freight was due September 5. This is the traffic over which a strenuous fight was made by New Orleans lines when the Mobile & Ohio made a low rate to Chicago.

Railway Mail Pay

The railroads' Committee on Railway Mail Pay has discussed the report submitted to Congress by the Joint Congressional Committee, and Mr. Peters, chairman of the railroads' committee (representing 218 principal railroads) expresses gratification that the congressional committee so fully and unanimously sustains the main contention that the railroads are now materially underpaid for carrying the mails; and also that it agrees that the railroads ought to be paid for the terminal messenger service they now perform. Continuing, he says: "While the congressional committee does not see eye-to-eye with the railroads as to the total compensation due the companies for their mail service, the railroad committee has expressed its willingness to accept the views of the Bourne committee upon this main question of fact. The specific plan proposed by the Bourne committee for hereafter meeting the underpayment due the companies is open to question. The feeling of the railroad managers is that the present system of payment, based on the weight of the mails and the distances over which it is carried, is scientific, and, that, if fairly administered, it should be satisfactory. It actually measures and provides payment for the actual service performed. The proposed plan does not.

"That, however, is a technical matter. The Bourne committee has established the doctrine that the railroads should be compensated on a commercial basis for the services they render. The railroad committee is now prepared to co-operate with Congress in establishing detailed standards of payment which should place this purely commercial relation of the government and the railways upon a sound business basis."

Western Society of Engineers

The first autumn meeting of the Western Society of Engineers will be held on Monday night, September 14, in the society's rooms in the Monadnock block, Chicago. Two papers will be presented: one on "The Permeability of Gravel Concrete," by M. O. Withey, assistant professor of mechanics at the University of Wisconsin, and the other on "Reactions in a Three-Legged Stiff Frame with Hinged Column Bases," by N. M. Stineman.

American Electric Railway Association

The American Electric Railway Association will hold its annual convention at Young's Million Dollar Pier, Atlantic City, N. J., October 12-16, five days. Special trains will be run from Chicago and St. Louis to Atlantic City. It is expected that the advance copies of the papers to be read will be in the hands of members by the middle of next week.

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

- AIR BRAKE ASSOCIATION.**—F. M. Nellis, 53 State St., Boston, Mass. Next convention, May 4-7, 1915, Hotel Sherman, Chicago.
- AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.**—A. G. Thomason, Demurrage Commissioner, Boston, Mass. Annual convention in April.
- AMERICAN ASSOCIATION OF DINING CAR SUPERINTENDENTS.**—H. C. Boardman, D. L. & W., Hoboken, N. J. Next convention, October 22-24, Washington, D. C.
- AMERICAN ASSOCIATION OF FREIGHT AGENTS.**—R. O. Wells, Illinois Central, East St. Louis, Ill. Annual meeting, May 21-24, 1915, Richmond, Va.
- AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.**—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York. Annual meeting, September 15-16, Boston, Mass.
- AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.**—E. H. Harman, Room 101, Union Station, St. Louis, Mo.
- AMERICAN ELECTRIC RAILWAY ASSOCIATION.**—E. B. Burritt, 29 W. 39th St., New York. Annual convention, October 12-16, Atlantic City, N. J.
- AMERICAN ELECTRIC RAILWAY MANUFACTURERS' ASSOCIATION.**—H. G. McConaughy, 165 Broadway, New York. Meetings with American Electric Railway Association.
- AMERICAN RAILWAY ASSOCIATION.**—W. F. Allen, 75 Church St., New York. Semi-annual meeting, November 18, Chicago.
- AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.**—C. A. Lichty, C. & N. W., Chicago. Next convention, October 20-22, 1914, Los Angeles, Cal.
- AMERICAN RAILWAY ENGINEERING ASSOCIATION.**—E. H. Fritch, 900 S. Michigan Ave., Chicago. Next convention, March 16-18, 1915, Chicago.
- AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.**—J. W. Taylor, 1112 Karpen Bldg., Chicago. Annual meeting, June, 1915.
- AMERICAN RAILWAY SAFETY ASSOCIATION.**—L. F. Shedd, C. R. I. & P., Chicago. Next meeting, November, Chicago.
- AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.**—A. R. Davis, Central of Georgia, Macon, Ga. Annual meeting, July, 1915.
- AMERICAN SOCIETY FOR TESTING MATERIALS.**—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.
- AMERICAN SOCIETY OF CIVIL ENGINEERS.**—Chas. W. Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except June, July and August, 220 W. 57th St., New York.
- AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.**—J. R. Wemlinger, 11 Broadway, New York. Regular meetings, 2d Thursday in month, at 2 P. M., 11 Broadway, New York.
- AMERICAN SOCIETY OF MECHANICAL ENGINEERS.**—Calvin W. Rice, 29 W. 39th St., New York. Annual meeting, December 1-4, 1914, New York.
- AMERICAN WOOD PRESERVERS' ASSOCIATION.**—F. J. Angier, B. & O., Mt. Royal Sta., Baltimore, Md. Next convention, January 19-21, 1915, Chicago.
- ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.**—E. R. Woodson, 1300 Pennsylvania Ave., N. W., Washington, D. C. Annual convention, April 28, 1915, Atlanta, Ga.
- ASSOCIATION OF MANUFACTURERS OF CHILLED CAR WHEELS.**—George W. Lyndon, 1214 McCormick Bldg., Chicago. Annual meeting, second Tuesday in October, New York.
- ASSOCIATION OF RAILWAY CLAIM AGENTS.**—C. W. Egan, B. & O., Baltimore, Md. Annual meeting, 3d week in May, 1915, Galveston, Tex.
- ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.**—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago. Annual convention, October 26-30, 1914, Chicago.
- ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.**—P. W. Drew, Soo Line, 112 West Adams St., Chicago. Annual meeting, June 22-25, Rochester, N. Y.
- ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.**—G. P. Conard, 75 Church St., New York. Next meeting, December 8-9, 1914, Richmond, Va.
- BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.**—L. D. Mitchell, Detroit Graphite Co., Chicago, Ill. Meetings with American Railway Bridge and Building Association.
- CANADIAN RAILWAY CLUB.**—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal, Que.
- CANADIAN SOCIETY OF CIVIL ENGINEERS.**—Clement H. McLeod, 176 Mansfield St., Montreal, Que. Regular meetings, 1st Thursday in October, November, December, February, March and April. Annual meeting, January, Montreal.
- CAR FOREMEN'S ASSOCIATION OF CHICAGO.**—Aaron Kline, 841 Lawler Ave., Chicago. Regular meetings, 2d Monday in month, except July and August, Lytton Bldg., Chicago.
- CENTRAL RAILWAY CLUB.**—H. D. Vought, 95 Liberty St., New York. Regular meetings, 2d Friday in January, May, September and November. Annual meeting, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.
- CIVIL ENGINEERS' SOCIETY OF ST. PAUL.**—Edw. J. Dugan, P. O. Box 654, August and September, Old State Capitol Bldg., St. Paul.
- ENGINEERS' SOCIETY OF PENNSYLVANIA.**—Edw. R. Dasher, Box 75, Harrisburg, Pa. Regular meetings, 1st Friday after 10th of each month, except July and August, 31 So. Front St., Harrisburg, Pa.
- ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.**—Elmer K. Hiles, 2511 Oliver Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday, Pittsburgh.
- FREIGHT CLAIM ASSOCIATION.**—Waiter P. Taylor, R. F. & P., Richmond, Va. Annual meeting, June 16, 1915, Chicago.
- GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.**—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday preceding 3d Thursday in month, Room 1856, Transportation Bldg., Chicago.
- INTERNATIONAL RAILWAY CONGRESS.**—Executive Committee, 11, Rue de Louvain, Brussels, Belgium. Next convention, June 23 to July 6, 1915, Berlin.
- INTERNATIONAL RAILWAY FUEL ASSOCIATION.**—C. G. Hall, C. & E. I., 922 McCormick Bldg., Chicago. Annual meeting, May 17-20, 1915, Chicago.
- INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.**—Wm. Hall, 829 W. Broadway, Winona, Minn. Next convention, July 14-17, 1915, Sherman House, Chicago.
- INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.**—A. L. Woodworth, C. H. & D., Lima, Ohio.
- MAINTENANCE OF WAY AND MASTER PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.**—T. I. Goodwin, C. R. I. & P., Eldon, Mo. Next convention, November 17-19, 1914, Detroit, Mich.
- MASTER BOILER MAKERS' ASSOCIATION.**—Harry D. Vought, 95 Liberty St., New York. Annual convention, May, 1915.
- MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.**—A. P. Dane, B. & M., Reading, Mass.
- MASTER CAR BUILDERS' ASSOCIATION.**—J. W. Taylor, 1112 Karpen Bldg., Chicago. Annual meeting, June, 1915.
- NATIONAL RAILWAY APPLIANCES ASSOCIATION.**—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Next convention, March 15-19, 1915, Chicago.
- NEW ENGLAND RAILROAD CLUB.**—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, except June, July, August and September, Boston.
- NEW YORK RAILROAD CLUB.**—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.
- NIAGARA FRONTIER CAR MEN'S ASSOCIATION.**—E. Frankenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings monthly.
- PEORIA ASSOCIATION OF RAILROAD OFFICERS.**—M. W. Rotchford, Union Station, Peoria, Ill. Regular meetings, 2d Thursday in month, Jefferson Hotel, Peoria.
- RAILROAD CLUB OF KANSAS CITY.**—C. Manlove, 1008 Walnut St., Kansas City, Mo. Regular meetings, 3d Friday in month, Kansas City.
- RAILROAD MASTER TINNERS, COPPERSMITHS AND PIPEFITTERS' ASSOCIATION.**—U. G. Thompson, C. & E. I., Danville, Ill. Annual meeting, May, 1915.
- RAILWAY BUSINESS ASSOCIATION.**—Frank W. Nixon, 30 Church St., New York. Annual meeting, December 10, 1914, Waldorf-Astoria Hotel, New York.
- RAILWAY CLUB OF PITTSBURGH.**—J. B. Anderson, Room 207, P. R. R. Sta., Pittsburgh, Pa. Regular meetings, 4th Friday in month, except June, July and August, Monongahela House, Pittsburgh.
- RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.**—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Association of Railway Electrical Engineers.
- RAILWAY FIRE PROTECTION ASSOCIATION.**—C. B. Edwards, Fire Ins. Agt., Mobile & Ohio, Mobile, Ala. Annual meeting, October 6, 1914, Washington, D. C.
- RAILWAY SIGNAL ASSOCIATION.**—C. C. Rosenberg, Times Bldg., Bethlehem, Pa. Annual meeting, September 22-24, 1914, Bluff Point, N. Y.
- RAILWAY STOREKEEPERS' ASSOCIATION.**—J. P. Murphy, L. S. & M. S., Box C, Collinwood, Ohio. Annual meeting, May, 1915.
- RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.**—J. D. Conway, 2136 Oliver Bldg., Pittsburgh, Pa. Meetings with M. C. B. and M. M. Associations.
- RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.**—G. A. Nelson, 50 Church St., New York. Meetings with Association of Railway Telegraph Superintendents.
- RICHMOND RAILROAD CLUB.**—F. O. Robinson, C. & O., Richmond, Va. Regular meetings, 2d Monday in month, except June, July and August.
- ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.**—L. C. Ryan, C. & N. W., Sterling, Ill.
- ST. LOUIS RAILWAY CLUB.**—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August, St. Louis.
- SALT LAKE CITY TRANSPORTATION CLUB.**—R. E. Rowland, Hotel Utah Bldg., Salt Lake City, Utah. Regular meetings, 1st Saturday of each month, Salt Lake City.
- SIGNAL APPLIANCE ASSOCIATION.**—F. W. Edmunds, 3868 Park Ave., New York. Meeting with annual convention Railway Signal Association.
- SOCIETY OF RAILWAY FINANCIAL OFFICERS.**—Carl Nyquist, C. R. I. & P., La Salle St. Sta., Chicago. Annual meeting, September 15-17, Hotel Aspinwall, Lenox, Mass.
- SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.**—E. W. Sandwich, A. & W. P. Ry., Atlanta, Ga.
- SOUTHERN AND SOUTHWESTERN RAILWAY CLUB.**—A. J. Merrill, Grant Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 A. M., Candler Bldg., Atlanta.
- TOLEDO TRANSPORTATION CLUB.**—J. S. Marks, Agent, Interstate Despatch, Toledo, Ohio. Regular meetings, 1st Saturday in month, Boody House, Toledo.
- TRACK SUPPLY ASSOCIATION.**—W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y. Meetings with Roadmasters' and Maintenance of Way Association.
- TRAFFIC CLUB OF CHICAGO.**—W. H. Wharton, La Salle Hotel, Chicago.
- TRAFFIC CLUB OF NEW YORK.**—C. A. Swope, 291 Broadway, New York. Regular meetings, last Tuesday in month, except June, July and August, Waldorf-Astoria, New York.
- TRAFFIC CLUB OF PITTSBURGH.**—D. L. Wells, Erie R. R., Pittsburgh, Pa. Meetings bimonthly, Pittsburgh. Annual meeting, 2d Monday in June.
- TRAFFIC CLUB OF ST. LOUIS.**—A. F. Versen, Mercantile Library Bldg., St. Louis, Mo. Annual meeting in November, Noonday meetings October to May.
- TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.**—J. F. Mackie, 7122 Stewart Ave., Chicago. Annual meeting June 15, 1915, Minneapolis, Minn.
- TRANSPORTATION CLUB OF DETROIT.**—W. R. Hurley, Superintendent's office, L. S. & M. S., Detroit, Mich. Meetings monthly, Normandie Hotel, Detroit.
- TRAVELING ENGINEERS' ASSOCIATION.**—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y. Next meeting, September 15-18, Hotel Sherman, Chicago.
- UTAH SOCIETY OF ENGINEERS.**—Frank W. Moore, Newhouse Bldg., Salt Lake City, Utah. Regular meetings, 3d Friday in month, except July and August, Consolidated Music Hall, Salt Lake City.
- WESTERN CANADA RAILWAY CLUB.**—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man. Regular meetings, 2d Monday, except June, July and August, Winnipeg.
- WESTERN RAILWAY CLUB.**—J. W. Taylor, 1112 Karpen Bldg., Chicago. Regular meetings, 3d Tuesday in month, except June, July and August, Karpen Bldg., Chicago.
- WESTERN SOCIETY OF ENGINEERS.**—J. H. Warder, 1735 Monadnock Block, Chicago. Regular meetings, 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF JULY, 1914

| Name of road. | Average mileage operated during period. | Operating revenues | | | | Operating expenses | | | | Net operating revenue (or deficit). | Railway tax accruals. | Operating income (or loss). | Increase (or decrease) comp. with last year. |
|---|---|--------------------|------------|-----------|------------------------------------|--------------------|----------|-----------------|----------------|-------------------------------------|-----------------------|-----------------------------|--|
| | | Freight. | Passenger. | Total. | Maintenance of way and structures. | Equipment. | Traffic. | Transportation. | Miscellaneous. | | | | |
| Alabama & Vicksburg..... | 143 | \$77,736 | \$41,827 | \$119,563 | \$21,831 | \$34,812 | \$3,619 | \$7,509 | \$3,023 | \$15,229 | \$7,240 | \$7,989 | —\$9,226 |
| Alabama Great Southern..... | 309 | 263,623 | 115,256 | 378,879 | 50,363 | 100,423 | 12,884 | 136,202 | 3,443 | 100,908 | 15,493 | 85,415 | 4,592 |
| Atchafalaya, Topeka & Santa Fe..... | 8,340 | 5,024,161 | 2,243,523 | 7,267,684 | 1,192,198 | 1,354,740 | 172,109 | 2,225,496 | ..... | 2,799,476 | 400,855 | 2,398,621 | 219,200 |
| Atlanta & West Point..... | 93 | 45,947 | 34,159 | 80,106 | 16,326 | 24,050 | 5,098 | 30,923 | 594 | 18,158 | 7,125 | 11,027 | 2,942 |
| Atlantic & St. Lawrence..... | 167 | 71,540 | 43,100 | 114,640 | 22,548 | 16,585 | 4,089 | 56,846 | ..... | 11,032 | 10,800 | 252 | 12,964 |
| Atlantic Coast Line..... | 4,664 | 1,618,666 | 709,896 | 2,328,562 | 469,938 | 494,506 | 50,914 | 989,170 | 6,672 | 2,083,748 | 138,000 | 313,850 | —21,478 |
| Baltimore & Ohio Chicago Terminal..... | 80 | ..... | 854 | 854 | 14,448 | 17,628 | 1,033 | 56,776 | 3,741 | 98,622 | 19,021 | 21,018 | —4,823 |
| Belt Ry. Co. of Chicago..... | 24 | ..... | ..... | ..... | 20,282 | 21,934 | 1,293 | 86,287 | ..... | 135,583 | 12,113 | 120,819 | 34,782 |
| Bessemer & Lake Erie..... | 204 | 1,061,712 | 41,854 | 1,103,566 | 96,191 | 194,318 | 9,126 | 206,061 | 2,210 | 519,935 | 18,000 | 598,526 | 58,526 |
| Bingham & Garfield..... | 27 | 158,029 | 5,081 | 163,110 | 18,381 | 21,884 | 919 | 27,283 | 85 | 71,041 | 2,991 | 89,918 | 11,555 |
| Birmingham Southern..... | 44 | 50,018 | 1,240 | 51,258 | 16,482 | 16,915 | 480 | 30,689 | ..... | 67,874 | 17,191 | 21,064 | —24,205 |
| Buffalo & Susquehanna Railroad Corp'n..... | 253 | 101,040 | 7,679 | 108,719 | 25,231 | 37,642 | 1,085 | 36,540 | ..... | 105,908 | 2,600 | 7,078 | ..... |
| Buffalo & Susquehanna Railway..... | 91 | 15,581 | 8,502 | 24,083 | 6,982 | 9,765 | 489 | 12,134 | 84 | 31,739 | 1,600 | 6,866 | —408 |
| Buffalo, Rochester & Pittsburgh..... | 586 | 728,026 | 114,651 | 842,677 | 143,664 | 198,162 | 12,155 | 257,872 | 1,467 | 631,975 | 20,000 | 229,479 | —78,657 |
| Central of Georgia..... | 1,924 | 716,324 | 349,056 | 1,065,380 | 161,158 | 217,229 | 39,047 | 402,810 | 1,453 | 856,048 | 52,360 | 257,926 | 139,397 |
| Central New England..... | 304 | 217,859 | 44,501 | 262,360 | 79,908 | 37,075 | 1,183 | 96,789 | ..... | 218,618 | 11,000 | 47,375 | —62,578 |
| Charleston & Western Carolina..... | 341 | 101,040 | 34,521 | 135,561 | 33,094 | 26,794 | 5,281 | 56,978 | ..... | 126,453 | 5,000 | 11,608 | 8,154 |
| Chesapeake & Ohio Lines..... | 2,367 | 2,475,819 | 587,346 | 3,063,165 | 424,715 | 712,717 | 58,016 | 1,039,773 | 23,542 | 2,329,078 | 109,922 | 825,097 | 58,936 |
| Chicago & Erie..... | 270 | 340,266 | 60,534 | 400,800 | 83,746 | 125,969 | 20,868 | 238,980 | 2,144 | 483,796 | 12,895 | 86,977 | —36,300 |
| Chicago & North Western..... | 8,108 | 4,344,456 | 2,198,704 | 6,543,160 | 1,236,312 | 1,073,854 | 119,540 | 2,441,269 | 58,817 | 5,072,066 | 375,000 | 1,862,790 | 185,554 |
| Chicago, Detroit & Can. Gd. Trunk Jctn..... | 60 | 43,825 | 21,392 | 65,217 | 9,022 | 11,026 | 1,679 | 33,205 | 509 | 56,810 | 2,870 | 22,519 | 14,918 |
| Chicago, Indiana & Southern..... | 359 | 289,255 | 29,741 | 318,996 | 52,117 | 98,059 | 6,809 | 109,387 | 1,811 | 285,829 | 18,600 | 27,230 | —6,704 |
| Chicago Junction..... | 12 | ..... | ..... | ..... | 20,396 | 17,047 | 953 | 81,436 | ..... | 124,771 | 2,324 | 36 | 27,986 |
| Chicago, Milwaukee & St. Paul..... | 9,987 | 5,169,571 | 1,843,240 | 7,012,811 | 1,068,249 | 1,051,291 | 149,308 | 2,823,798 | 73,105 | 5,045,915 | 395,174 | 2,381,851 | 151,582 |
| Chicago, Peoria & St. Louis..... | 255 | 117,108 | 29,504 | 146,612 | 22,294 | 35,947 | 5,823 | 62,138 | ..... | 131,001 | 4,800 | 18,570 | 11,971 |
| Chicago, Rock Island & Gulf..... | 477 | 161,488 | 55,815 | 217,303 | 40,676 | 29,251 | 9,635 | 97,325 | 2,132 | 185,444 | 8,815 | 39,988 | 4,408 |
| Chicago, St. Paul, Minneapolis & Omaha..... | 1,753 | 906,444 | 534,150 | 1,440,594 | 216,347 | 173,634 | 11,157 | 324,445 | 17,375 | 1,043,253 | 514,027 | 427,229 | 125,162 |
| Cincinnati, Hamilton & Dayton..... | 1,015 | 682,159 | 155,656 | 837,815 | 127,347 | 153,510 | 18,634 | 396,992 | ..... | 714,250 | 36,569 | 188,228 | 74,340 |
| Cincinnati, New Orleans & Texas Pacific..... | 337 | 645,304 | 140,661 | 785,965 | 83,543 | 218,605 | 25,139 | 258,789 | 4,359 | 610,477 | 31,000 | 190,022 | —27,600 |
| Cincinnati Northern..... | 246 | 99,778 | 24,200 | 123,978 | 19,333 | 25,501 | 2,622 | 42,342 | ..... | 92,942 | 6,000 | 31,165 | 45,963 |
| Cleveland, Cincinnati, Chic. & St. Louis..... | 2,361 | 2,026,348 | 840,915 | 2,867,263 | 296,803 | 644,406 | 78,580 | 1,182,835 | 26,634 | 2,291,600 | 124,500 | 730,453 | 627,533 |
| Colorado Midland..... | 338 | 91,696 | 35,028 | 126,724 | 38,987 | 40,533 | 8,671 | 61,271 | 2,072 | 156,737 | 10,000 | 31,713 | —1,306 |
| Colorado & Southern..... | 1,127 | 389,919 | 168,915 | 558,834 | 112,825 | 167,262 | 12,388 | 196,737 | 1,294 | 514,380 | 35,625 | 56,020 | —11,715 |
| Cumberland Valley..... | 164 | 167,434 | 59,888 | 227,322 | 52,715 | 29,149 | 4,919 | 77,919 | 811 | 170,789 | 5,910 | 63,555 | —28,599 |
| Delaware, Lackawanna & Western..... | 960 | 2,526,521 | 853,981 | 3,380,502 | 581,041 | 551,198 | 73,042 | 1,142,821 | 37,459 | 2,439,783 | 185,000 | 1,126,979 | —1,003 |
| Detroit & Mackinac..... | 411 | 59,633 | 35,031 | 94,664 | 16,709 | 16,709 | 2,228 | 35,208 | 340 | 70,177 | 9,189 | 24,292 | —4,464 |
| Detroit, Toledo, Shore Line..... | 79 | 91,696 | 35,028 | 126,724 | 38,987 | 40,533 | 8,671 | 61,271 | 2,072 | 156,737 | 10,000 | 31,713 | —1,306 |
| Detroit, Grand Haven & Milwaukee..... | 191 | 130,000 | 65,000 | 195,000 | 46,575 | 30,976 | 6,900 | 107,725 | 1,294 | 197,882 | 3,360 | 20,664 | —28,336 |
| Detroit, Toledo & Ironton..... | 441 | 121,152 | 17,254 | 138,406 | 20,743 | 22,943 | 3,018 | 77,433 | ..... | 136,595 | 6,000 | 13,249 | 58,166 |
| Duluth & Iron Range..... | 292 | 761,183 | 21,718 | 782,901 | 108,000 | 80,813 | 1,996 | 140,427 | 4,172 | 343,734 | 43,331 | 425,188 | —268,079 |
| Duluth, Missabe & Northern..... | 364 | 804,322 | 31,958 | 836,280 | 100,863 | 84,959 | 2,043 | 128,180 | 3,807 | 329,009 | 42,961 | 484,199 | —288,022 |
| Duluth, Winnipeg & Pacific..... | 181 | 107,907 | 19,758 | 127,665 | 36,424 | 23,978 | 2,578 | 44,523 | 94 | 113,745 | 6,503 | 10,417 | —30,220 |
| El Paso & Southwestern Co..... | 1,039 | 583,828 | 116,788 | 700,616 | 70,159 | 100,984 | 18,498 | 203,777 | 5,720 | 444,440 | 38,210 | 255,304 | —30,220 |
| Elgin, Joliet & Eastern..... | 777 | 752,354 | 800,348 | 1,552,702 | 106,767 | 148,252 | 4,963 | 253,745 | ..... | 492,821 | 32,833 | 271,693 | —105,073 |
| Erie..... | 1,988 | 3,554,650 | 997,644 | 4,552,294 | 544,668 | 1,057,640 | 90,962 | 1,657,450 | 36,310 | 3,526,209 | 138,547 | 1,314,909 | —150,209 |
| Florence & Cripple Creek..... | 87 | 69,744 | 21,119 | 90,863 | 12,417 | 9,728 | 2,250 | 35,134 | ..... | 63,674 | 5,677 | 23,186 | —25,819 |
| Florida East Coast..... | 606 | 137,705 | 113,793 | 251,498 | 71,465 | 52,111 | 6,050 | 120,908 | 2,937 | 265,748 | 26,117 | 6,095 | 35,200 |
| Fort Worth & Denver City..... | 454 | 266,200 | 143,162 | 409,362 | 44,682 | 79,456 | 10,438 | 168,133 | 3,220 | 321,084 | 12,920 | 99,756 | 24,531 |
| Grand Rapids & Indiana..... | 575 | 237,635 | 210,839 | 448,474 | 55,334 | 64,918 | 10,438 | 200,067 | 2,897 | 346,848 | 24,221 | 118,510 | 41,542 |
| Grand Trunk Western..... | 347 | 382,000 | 128,000 | 510,000 | 103,456 | 119,259 | 19,500 | 249,948 | 13,069 | 521,023 | 35,920 | 53,495 | —65,755 |
| Great Northern..... | 7,994 | 4,716,860 | 1,452,169 | 6,169,029 | 911,393 | 703,649 | 120,973 | 1,643,850 | 81,485 | 3,560,308 | 383,981 | 2,880,028 | —228,612 |
| Gulf & Ship Island..... | 308 | 106,148 | 33,981 | 140,129 | 19,507 | 28,554 | 2,837 | 41,405 | 362 | 100,927 | 7,276 | 45,333 | —30,003 |
| Gulf, Colorado & Santa Fe..... | 1,937 | 1,023,882 | 313,853 | 1,337,735 | 182,810 | 228,425 | 26,332 | 486,398 | ..... | 955,435 | 51,055 | 402,481 | 224,928 |
| Illinois Central..... | 4,769 | 3,781,139 | 1,214,498 | 4,995,637 | 906,982 | 1,310,261 | 98,676 | 1,946,128 | 30,479 | 4,414,540 | 275,000 | 706,341 | —62,139 |
| Indiana Harbor Belt..... | 105 | ..... | ..... | ..... | 47,399 | 284,772 | 2,686 | 113,928 | ..... | 214,763 | 7,785 | 62,076 | —7,409 |
| International & Great Northern..... | 1,159 | 497,398 | 188,330 | 685,728 | 129,929 | 140,508 | 27,436 | 451,361 | 2,779 | 792,405 | 25,600 | 78,607 | —180,009 |
| Kanawha & Michigan..... | 177 | 241,407 | 31,467 | 272,874 | 33,481 | 60,661 | 2,483 | 75,257 | ..... | 176,211 | 11,773 | 89,409 | —5,509 |
| Lake Erie & Western..... | 906 | 405,117 | 76,873 | 481,990 | 73,924 | 62,087 | 15,047 | 193,031 | ..... | 356,172 | 24,000 | 126,851 | 70,245 |
| Lake Shore & Michigan Southern..... | 1,852 | 2,656,716 | 1,304,618 | 3,961,334 | 542,113 | 964,856 | 70,908 | 1,487,932 | 56,039 | 3,210,766 | 196,500 | 1,183,749 | —288,449 |
| Lehigh & New England..... | 296 | 221,522 | 1,219 | 222,741 | 31,639 | 32,843 | 1,699 | 54,887 | ..... | 127,120 | 5,670 | 100,553 | 50,725 |
| Lehigh Valley..... | 1,444 | 2,921,757 | 457,342 | 3,379,099 | 422,089 | 722,427 | 79,912 | 1,216,646 | 14,592 | 2,526,674 | 137,000 | 918,097 | —91,093 |

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF JULY, 1914—CONTINUED

| Name of road. | Average mileage operated during period. | Operating revenues | | | | Operating expenses | | | | Net operating revenue (or deficit). | Railway tax accruals. | Operating income (or loss). | Increase (or decrease) in income comp. with last year. |
|---|---|--------------------|------------|------------|----------------|--------------------|-------------------|----------------|----------|-------------------------------------|-----------------------|-----------------------------|--|
| | | Freight. | Passenger. | Total. | Miscellaneous. | Traffic. | Trans- portation. | Miscellaneous. | General. | | | | |
| Long Island | 398 | 299,806 | 1,030,540 | 1,519,806 | 118,025 | 125,422 | 493,853 | 6,016 | 29,317 | 794,736 | 65,362 | 659,638 | 32,692 |
| Louisiana & Arkansas | 279 | 123,295 | 24,428 | 152,151 | 30,716 | 16,071 | 37,788 | ..... | 3,988 | 101,257 | 40,894 | 40,894 | —2,419 |
| Louisiana Ry. & Navigation | 351 | 132,690 | 25,216 | 167,891 | 33,241 | 16,056 | 62,435 | ..... | 4,882 | 122,487 | 45,404 | 36,904 | 19,379 |
| Louisville & Nashville | 4,991 | 3,401,955 | 1,095,550 | 4,803,643 | 720,796 | 985,532 | 1,602,022 | 15,850 | 110,168 | 3,548,590 | 184,275 | 1,070,337 | 126,371 |
| Maine Central | 1,209 | 542,648 | 389,827 | 1,014,868 | 162,018 | 138,613 | 370,663 | 10,717 | 26,138 | 719,284 | 52,129 | 243,455 | 42,210 |
| Michigan Central | 1,800 | 1,568,567 | 944,039 | 2,838,342 | 336,599 | 452,322 | 1,078,933 | 47,277 | 53,892 | 2,032,887 | 134,000 | 671,455 | 124,261 |
| Midland Valley | 380 | 67,673 | 42,235 | 116,266 | 26,992 | 36,558 | 41,912 | ..... | 5,541 | 102,949 | 13,317 | 6,582 | —17,878 |
| Minneapolis, St. Paul & Sault Ste. Marie | 4,102 | 1,639,555 | 645,919 | 2,485,501 | 362,578 | 365,459 | 753,077 | 18,029 | 46,917 | 1,592,343 | 111,580 | 781,579 | —22,269 |
| Missouri & North Arkansas | 365 | 65,220 | 40,188 | 112,040 | 22,075 | 5,024 | 43,105 | ..... | 5,615 | 106,263 | 5,777 | 361 | —11,853 |
| Missouri, Oklahoma & Gulf | 332 | 73,748 | 23,227 | 100,956 | 18,685 | 17,027 | 44,893 | 71 | 5,665 | 90,666 | 6,462 | 3,782 | —3,797 |
| Missouri, Oklahoma & Gulf Ry. of Texas | 19 | 9,432 | 460 | 10,200 | 1,687 | 2,725 | 4,712 | ..... | 676 | 9,998 | 203 | 6 | 78 |
| Monongahela | 67 | 91,788 | 2,558 | 95,717 | 17,274 | 5,810 | 22,098 | ..... | 1,981 | 48,177 | 47,540 | 45,440 | —31,936 |
| Nashville, Chattanooga & St. Louis | 1,231 | 732,242 | 258,434 | 1,071,780 | 145,206 | 204,209 | 405,916 | 9,382 | 29,661 | 837,895 | 27,213 | 206,673 | 71,688 |
| Nevada Northern | 165 | 124,539 | 18,006 | 141,289 | 24,960 | 17,669 | 30,153 | 22 | 4,699 | 77,987 | 63,302 | 5,702 | —7,275 |
| New Orleans & North Eastern | 204 | 244,953 | 53,736 | 327,213 | 29,987 | 69,675 | 111,851 | 5,272 | 11,691 | 237,700 | 14,500 | 75,013 | 857 |
| New Orleans Great Northern | 283 | 108,246 | 32,857 | 155,069 | 19,208 | 20,018 | 44,253 | 228 | 6,330 | 92,291 | 3,167 | 59,611 | —10,578 |
| New Orleans, Texas & Mexico | 286 | 119,819 | 21,993 | 149,407 | 32,984 | 16,976 | 53,377 | ..... | 7,971 | 116,826 | 32,581 | 30,960 | —2,741 |
| New York Central & Hudson River | 3,692 | 4,825,497 | 3,266,777 | 9,543,460 | 1,251,942 | 1,728,415 | 3,288,473 | 190,180 | 259,307 | 6,870,714 | 492,211 | 2,180,379 | 208,378 |
| New York, Chicago & St. Louis | 567 | 706,958 | 166,890 | 920,658 | 126,500 | 87,497 | 405,308 | 6,562 | 17,772 | 680,074 | 42,000 | 198,465 | 108,177 |
| New York, New Haven & Hartford | 2,003 | 2,596,430 | 2,584,644 | 5,181,074 | 822,566 | 770,010 | 2,077,998 | 43,418 | 123,685 | 3,883,352 | 310,000 | 1,561,626 | —18,802 |
| New York, Ontario & Western | 568 | 552,579 | 304,519 | 992,561 | 129,411 | 146,556 | 311,899 | ..... | 14,484 | 611,112 | 381,450 | 361,860 | 4,296 |
| New York, Philadelphia & Norfolk | 112 | 363,978 | 47,443 | 442,619 | 34,363 | 36,799 | 163,268 | 4,780 | 9,622 | 280,696 | 163,223 | 153,223 | 43,692 |
| New York, Susquehanna & Western | 140 | 162,655 | 51,869 | 237,085 | 30,225 | 29,035 | 106,126 | ..... | 6,691 | 174,023 | 63,061 | 50,477 | 7,554 |
| Norfolk & Western | 2,037 | 3,168,639 | 424,252 | 3,743,588 | 552,527 | 773,732 | 1,079,759 | 9,512 | 67,822 | 2,515,422 | 140,000 | 1,088,166 | —72,396 |
| Norfolk Southern | 860 | 201,207 | 94,636 | 322,141 | 54,134 | 58,237 | 116,952 | ..... | 18,729 | 256,098 | 66,043 | 54,543 | —29,899 |
| Northern Pacific | 6,409 | 3,640,634 | 1,580,686 | 5,292,063 | 906,563 | 971,718 | 1,668,051 | 96,539 | 91,132 | 3,735,226 | 410,960 | 1,645,747 | —136,410 |
| Panhandle & Santa Fe | 668 | 214,304 | 56,824 | 285,947 | 47,017 | 60,841 | 94,569 | ..... | 9,612 | 315,441 | 70,506 | 61,057 | 37,877 |
| Pennsylvania Company | 1,750 | 3,720,365 | 926,091 | 5,198,495 | 736,845 | 832,281 | 1,747,440 | 37,080 | 112,109 | 3,545,556 | 278,047 | 1,376,892 | —283,643 |
| Pennsylvania Railroad | 4,519 | 11,136,608 | 3,591,145 | 16,068,587 | 2,110,352 | 3,030,438 | 5,900,340 | 235,809 | 388,918 | 11,854,559 | 653,145 | 3,560,883 | —344,376 |
| Philadelphia, Baltimore & Washington | 717 | 1,029,068 | 656,480 | 1,852,017 | 293,174 | 351,742 | 772,241 | 17 | 39,214 | 1,484,008 | 56,230 | 311,779 | —123,535 |
| Pittsburgh & Lake Erie | 224 | 1,275,788 | 165,186 | 1,503,661 | 167,603 | 330,187 | 340,541 | 4,013 | 27,729 | 883,991 | 619,671 | 568,121 | 173,775 |
| Pittsburgh, Cincinnati, Chic. & St. Louis | 1,472 | 2,157,436 | 732,701 | 3,476,200 | 461,900 | 622,088 | 1,192,389 | 24,088 | 78,116 | 3,325,711 | 1,042,498 | 878,210 | 200,272 |
| Pittsburgh, Shawmut & North | 294 | 132,466 | 12,408 | 146,732 | 36,613 | 49,693 | 97,969 | ..... | 4,230 | 143,806 | 3,074 | 713 | —2,476 |
| Richmond, Fredericksburg & Potomac | 88 | 159,488 | 70,174 | 237,913 | 20,886 | 30,067 | 91,136 | 462 | 6,934 | 153,046 | 104,867 | 97,230 | —15,298 |
| Rutland | 468 | 175,405 | 90,887 | 306,908 | 40,311 | 54,495 | 130,654 | 1,219 | 5,602 | 271,472 | 17,095 | 48,341 | —27,310 |
| St. Louis Merchants' Bridge Terminal | 9 | 146,599 | 20,211 | 166,810 | 20,211 | 20,211 | 72,733 | ..... | 5,886 | 105,411 | 41,188 | 35,358 | 25,949 |
| St. Louis, San Francisco & Texas | 244 | 105,659 | 32,098 | 147,714 | 17,792 | 21,450 | 51,849 | ..... | 4,948 | 100,869 | 44,326 | 4,922 | —1,229 |
| St. Louis Southern of Texas | 811 | 195,704 | 100,725 | 327,578 | 83,508 | 79,424 | 142,073 | 1,270 | 16,002 | 334,720 | 13,500 | —25,767 | —10,862 |
| San Antonio & Aransas Pass | 724 | 208,369 | 128,691 | 357,418 | 55,116 | 51,038 | 167,203 | ..... | 12,189 | 292,319 | 65,099 | 53,099 | 8,666 |
| San Pedro, Los Angeles & Salt Lake | 1,132 | 546,201 | 253,326 | 878,791 | 102,470 | 138,743 | 279,565 | 15,253 | 19,084 | 587,385 | 291,406 | 250,356 | 28,395 |
| Seaboard | 3,098 | 1,198,662 | 426,939 | 1,833,171 | 222,968 | 268,249 | 688,026 | 6,601 | 54,441 | 1,307,932 | 525,239 | 433,949 | 7,252 |
| Southern | 7,036 | 3,539,575 | 1,639,086 | 5,205,119 | 759,085 | 1,063,475 | 2,115,896 | 38,708 | 180,148 | 4,310,328 | 1,394,791 | 1,695,472 | —35,817 |
| Southern Pacific | 6,492 | 5,366,116 | 2,576,539 | 8,741,556 | 958,990 | 1,292,872 | 2,765,969 | 146,905 | 223,635 | 5,340,884 | 425,541 | 2,772,961 | —359,837 |
| Spokane International | 163 | 60,521 | 19,277 | 83,777 | 11,856 | 5,128 | 22,754 | ..... | 3,621 | 45,550 | 3,728 | 34,435 | —2,697 |
| Tennessee Central | 294 | 103,832 | 41,989 | 154,153 | 28,441 | 18,223 | 51,030 | ..... | 6,634 | 109,715 | 44,438 | 39,979 | —4,342 |
| Terminal R. R. Ass'n of St. Louis | 34 | ..... | 199 | 213,916 | 20,364 | 12,072 | 73,558 | ..... | 5,243 | 112,114 | 101,802 | 75,618 | 24,416 |
| Toledo & Ohio Central | 446 | 231,951 | 58,302 | 316,407 | 66,186 | 76,188 | 132,780 | 1,758 | 10,055 | 301,360 | 15,047 | 15,047 | —123,121 |
| Toledo, Peoria & Western | 248 | 66,767 | 41,622 | 114,572 | 18,329 | 27,093 | 45,470 | ..... | 3,780 | 96,982 | 17,589 | 6,100 | —8,508 |
| Toledo, St. Louis & Western | 451 | 338,766 | 37,184 | 402,559 | 45,079 | 62,511 | 144,750 | ..... | 7,833 | 276,127 | 126,432 | 115,932 | —18,753 |
| Trinity & Brazos Valley | 463 | 88,681 | 39,311 | 135,817 | 22,545 | 9,159 | 58,806 | ..... | 9,633 | 107,058 | 28,759 | 23,857 | 59,044 |
| Union R. R. of Baltimore | 9 | 115,857 | 21,132 | 138,627 | 13,297 | 13,297 | 4,803 | ..... | 2,333 | 20,433 | 118,194 | 112,014 | —12,922 |
| Union R. R. of Pennsylvania | 31 | ..... | 393,818 | 393,818 | 70,156 | 98,709 | 144,545 | ..... | 2,966 | 316,476 | 6,000 | 71,342 | —109,234 |
| Vandalia | 910 | 659,998 | 220,401 | 956,462 | 152,518 | 22,177 | 350,926 | 12,000 | 21,741 | 742,315 | 32,219 | 181,856 | —20,352 |
| Vicksburg, Shreveport & Pacific | 171 | 74,105 | 46,716 | 133,099 | 21,807 | 31,646 | 47,232 | 2,417 | 5,038 | 111,262 | 21,837 | 14,637 | —8,093 |
| Virginian | 503 | 382,182 | 40,329 | 450,818 | 64,283 | 88,903 | 110,491 | 8,368 | 9,714 | 283,548 | 167,270 | 144,760 | —31,468 |
| Wabash | 2,518 | 1,776,702 | 655,312 | 2,649,453 | 345,829 | 434,473 | 949,777 | 18,391 | 65,955 | 1,909,650 | 83,382 | 656,226 | 34,432 |
| Washington Southern | 36 | 47,086 | 34,320 | 109,693 | 13,327 | 16,779 | 43,588 | 26 | 2,946 | 78,000 | 31,320 | 28,373 | 2,026 |
| West Jersey & Seashore | 356 | 164,010 | 619,811 | 831,305 | 97,182 | 95,621 | 272,386 | 3,301 | 12,370 | 493,205 | 26,959 | 311,141 | 32,245 |
| Western Maryland | 661 | 579,491 | 104,080 | 712,429 | 105,019 | 111,751 | 266,132 | 706 | 17,996 | 521,503 | 24,500 | 166,426 | 14,967 |
| Western Ry. of Alabama | 133 | 51,609 | 43,520 | 105,029 | 23,173 | 26,710 | 33,575 | 587 | 4,849 | 94,355 | 10,674 | 5,008 | —2,294 |
| Wheeling & Lake Erie | 459 | 423,914 | 363,360 | 831,094 | 71,913 | 107,306 | 181,791 | 1,570 | 16,436 | 387,920 | 32,435 | 110,867 | —32,661 |
| Yazoo & Mississippi Valley | 1,372 | 587,158 | 215,250 | 833,191 | 177,228 | 156,885 | 347,155 | 813 | 23,509 | 722,245 | 50,000 | 80,886 | 42,225 |

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF JUNE, 1914

| Name of road. | Average mileage operated during period. | Operating revenues | | | Maintenance | | | Operating expenses | | | Net operating revenue (or deficit). | Outside operations, net. | Taxes. | Operating income (or loss). | Increase (or decr.) comp. with last year. |
|--|---|--------------------|------------|-------------------|---------------------|---------------|-------------------|--------------------|-----------|----------|-------------------------------------|--------------------------|----------|-----------------------------|---|
| | | Freight. | Passenger. | Total. inc. misc. | Way and structures. | Of equipment. | Trans- portation. | Traffic. | Total. | General. | | | | | |
| Arizona Eastern..... | 367 | 184,703 | 34,503 | 222,020 | 30,727 | 30,472 | 71,511 | 2,839 | 146,237 | 10,688 | 85,783 | 219 | 12,260 | 73,742 | 68,561 |
| Atlanta, Birmingham & Atlantic..... | 646 | \$161,154 | \$53,612 | \$239,916 | \$21,778 | \$34,825 | \$114,803 | \$13,703 | \$196,597 | \$11,488 | \$43,319 | ..... | \$14,337 | \$28,982 | \$27,395 |
| Atlantic & St. Lawrence..... | 167 | 75,835 | 38,957 | 130,041 | 36,124 | 20,808 | 53,243 | 5,066 | 120,855 | 5,614 | 9,546 | ..... | 18,009 | 8,463 | 11,970 |
| Atlantic City | 167 | 65,759 | 167,489 | 243,557 | 32,574 | 19,621 | 100,590 | 2,771 | 136,019 | 463 | 87,538 | ..... | 20,000 | 64,648 | 2,734 |
| Bessemer & Lake Erie..... | 204 | 1,020,071 | 30,139 | 1,060,609 | 97,619 | 191,551 | 210,346 | 8,519 | 520,772 | 12,737 | 539,837 | ..... | 18,000 | 521,837 | 55,402 |
| Birmingham Southern | 44 | 45,526 | 1,276 | 84,669 | 14,021 | 19,443 | 30,327 | 434 | 68,057 | 3,832 | 16,612 | ..... | 2,198 | 14,414 | 19,184 |
| Boston & Maine..... | 2,252 | 2,428,865 | 1,350,527 | 4,123,004 | 679,536 | 662,834 | 1,764,777 | 48,845 | 3,268,563 | 112,571 | 854,441 | \$13,051 | 152,591 | 714,901 | 405,646 |
| Central of Georgia..... | 1,924 | 555,627 | 305,074 | 951,971 | 193,131 | 178,890 | 395,007 | 41,030 | 851,864 | 43,806 | 100,107 | 6,948 | 52,360 | 54,695 | 36,348 |
| Central of New Jersey..... | 678 | 1,814,670 | 471,607 | 2,286,277 | 339,518 | 428,941 | 726,033 | 38,753 | 1,603,937 | 70,692 | 760,116 | 2,362 | 115,145 | 642,609 | 1,934 |
| Central New England..... | 304 | 247,148 | 41,031 | 302,766 | 70,176 | 44,371 | 186,799 | 1,497 | 306,623 | 3,780 | 3,857 | 637 | 6,304 | 9,524 | 118,050 |
| Chicago & Alton..... | 1,033 | 633,063 | 347,235 | 1,067,559 | 164,212 | 296,090 | 372,430 | 23,106 | 893,087 | 35,249 | 174,472 | 4,732 | 50,770 | 118,950 | 67,611 |
| Detroit, Grand Haven & Milwaukee..... | 191 | 137,844 | 58,003 | 236,229 | 44,548 | 31,424 | 104,360 | 7,622 | 196,352 | 8,398 | 39,877 | 3 | 672 | 39,202 | 18,221 |
| Grand Trunk Western..... | 347 | 453,859 | 146,177 | 628,773 | 113,050 | 66,325 | 257,229 | 27,766 | 493,137 | 28,767 | 135,636 | 3,573 | 84,532 | 47,531 | 46,053 |
| Louisville & Nashville..... | 4,941 | 3,198,671 | 1,032,290 | 4,515,757 | 705,522 | 964,423 | 1,612,108 | 125,003 | 3,502,666 | 95,610 | 1,013,091 | 2,213 | 750,930 | 259,948 | 312,322 |
| Louisville, Henderson & St. Louis..... | 200 | 73,954 | 43,176 | 123,957 | 22,053 | 12,961 | 38,808 | 6,114 | 83,469 | 3,533 | 40,488 | 291 | 5,863 | 34,916 | 20,340 |
| Missouri Pacific | 3,920 | 1,522,663 | 439,761 | 2,163,502 | 307,163 | 404,902 | 802,603 | 52,365 | 1,611,658 | 44,625 | 551,844 | 3,666 | 98,974 | 449,204 | 141,615 |
| New Orleans Great Northern..... | 283 | 105,822 | 31,006 | 150,328 | 18,319 | 27,464 | 38,399 | 2,196 | 93,832 | 7,474 | 56,476 | 29 | 3,330 | 53,117 | 21,560 |
| New York, New Haven & Hartford..... | 2,003 | 2,795,845 | 2,311,398 | 5,778,516 | 960,633 | 1,075,407 | 1,803,275 | 68,312 | 4,169,208 | 261,581 | 1,609,308 | 2,732 | 278,219 | 1,328,357 | 476,970 |
| Northern Pacific | 6,354 | 3,547,308 | 1,381,806 | 5,657,637 | 1,148,641 | 379,453 | 1,172,869 | 136,849 | 2,929,442 | 91,630 | 2,728,195 | 23,386 | 442,162 | 2,309,419 | 366,807 |
| Philadelphia & Reading..... | 1,020 | 2,913,416 | 583,789 | 3,700,179 | 685,295 | 681,327 | 1,435,468 | 41,438 | 2,908,620 | 65,092 | 791,596 | 48,577 | 137,996 | 702,140 | 482,801 |
| Port Reading | 21 | 81,097 | ..... | 87,733 | 19,552 | Cr. | 30,716 | 38 | 50,232 | 1,382 | 37,501 | 1,548 | 19,000 | 16,953 | 37,947 |
| St. Louis, Iron Mountain & Southern..... | 3,365 | 1,818,469 | 495,335 | 2,523,628 | 343,366 | 500,440 | 795,688 | 52,955 | 1,742,596 | 50,147 | 781,032 | 3,618 | 123,936 | 653,478 | 57,409 |

Traffic News

The Western Classification Committee has announced hearings at its Chicago office on September 16, September 22, September 29, September 30, October 1, and October 6.

Freight, except perishable, for points in Great Britain, Ireland and also for Norway, is now accepted by American railroads without requiring the inland American freight charges to be prepaid.

The Southern Pacific announces that during July out of a total of 7,632 local trains arriving at terminals on its Pacific system, 6,821, or nearly 91 per cent, made schedule time or better, and 6,709 arrived on time. Of the others 460 were less than 15 minutes late.

The Nashville, Chattanooga & St. Louis took out of Nashville the other day a solid train of 28 carloads of flour, 8,700 barrels, destined for Europe by way of New Orleans. The train was run through on a passenger schedule by way of the Mobile & Ohio and the New Orleans & North Eastern.

The Chicago, Burlington & Quincy has announced that passenger service will be established over the new Galveston-Puget Sound route about October 15, through the installation of through service from Denver to the north branch. Later through sleeping car service will be inaugurated between Galveston and Seattle.

The Denver Clearing House Association has adopted resolutions urging the Colorado representatives in Congress "at once to advocate and work for the submission of a joint resolution asking for such prompt revision by the Interstate Commerce Commission of its recent decision as shall afford substantial and adequate relief to all railroads in the present emergency."

The Erie, which recently established a lighterage service on the Chicago river for carload freight, has announced that beginning October 1 it will lighter 1. c. l. freight to and from industries that have dock facilities on the Chicago river. The notice provides that the Erie shall receive the road haul, and the limit is a minimum of 10,000 lb. outbound in a single shipment, or 10,000 lb. inbound received for one industry in one day. This new service is in addition to the car float service, which was established by the Erie some time ago.

The through night passenger trains of the Seaboard Air Line between Savannah, Ga., and Montgomery, Ala., are not very profitable, and the company recently asked authority from the State Railroad Commission of Georgia to discontinue the trains; and at the same time announcing that day and evening trains would be put on so as to largely take the place of the trains discontinued. But because of a good deal of opposition from a number of towns, the petition before the commission has been withdrawn, and the night trains are to be continued.

On September 2, the Grand Trunk Pacific began the operation of through passenger service on its western division between Edmonton and Prince Rupert. Passenger trains between Winnipeg and Edmonton have been in daily operation for some time. On September 2, a tri-weekly service was established between Edmonton and Prince George, and a bi-weekly service between Prince George and Prince Rupert, the Pacific coast terminal. Through trains for Prince Rupert will leave Winnipeg on Mondays and Saturdays, and will leave Prince Rupert for Winnipeg on Sundays and Tuesdays.

The Northern Pacific has opened a new suburban freight station at Seattle, Wash. The building cost \$20,000, and is intended to afford a level haul for shippers and receivers north of Madison street in the wholesale section of the city. The company expended \$750,000 in reaching this station, \$200,000 of which was paid to the city of Seattle for right of way. The branch to the freight station leaves the main line at Ross station, and follows Lake Union to the new terminal yards. It gives the Northern Pacific valuable water front rights in the vicinity of the new ship-canal which is to connect Lake Washington with salt water shipping at Salmon Bay.

CAR BALANCE AND PERFORMANCE FOR MAY, 1914

| | New England. | N. Y., N. J., Del., Md., Eastern Pa. | Ohio, Ind., Mich., Western Pa. | Va., W. Va., No. and So. Carolina. | Ky., Tenn., Miss., Ala., Ga., Fla. | Iowa, Ill., Wis., Minn. | Mont., Wyo., Neb., Dakotas. | Kan., Colo., Okla., Mo., Ark. | Texas, La., New Mex. | Ore., Idaho, Nev., Cal., Ariz. | Canadian Lines. | Grand Total. |
|--|--------------|--------------------------------------|--------------------------------|------------------------------------|------------------------------------|-------------------------|-----------------------------|-------------------------------|----------------------|--------------------------------|-----------------|----------------|
| Revenue freight cars owned..... | 89,198 | 702,861 | 207,198 | 195,585 | 176,453 | 456,221 | 20,351 | 144,830 | 31,884 | 144,698 | 181,132 | 2,350,411 |
| Average number of system cars on line..... | 55,773 | 457,071 | 154,333 | 123,529 | 117,680 | 349,535 | 10,908 | 95,100 | 24,710 | 113,351 | 113,351 | 1,586,614 |
| Railway-owned cars: Average foreign on line..... | 39,974 | 233,470 | 83,925 | 60,321 | 48,662 | 95,396 | 9,227 | 40,882 | 16,776 | 34,173 | 50,364 | 713,170 |
| Total railway-owned cars on line..... | 95,747 | 690,541 | 238,258 | 183,850 | 166,342 | 444,931 | 20,135 | 135,982 | 41,486 | 118,797 | 163,715 | 2,299,784 |
| Excess..... | 6,549 | *12,320 | 31,060 | *11,735 | *10,111 | *11,290 | *216 | *8,848 | 9,602 | *25,901 | *17,417 | *50,627 |
| Per cent of cars on line to total owned: | | | | | | | | | | | | |
| Home..... | 62 | 65 | 74 | 63 | 67 | 77 | 54 | 66 | 77 | 58 | 62 | 68 |
| Foreign..... | 45 | 33 | 41 | 31 | 27 | 21 | 45 | 28 | 53 | 24 | 28 | 30 |
| Private cars on line..... | 107 | 98 | 115 | 94 | 94 | 98 | 99 | 94 | 130 | 82 | 90 | 98 |
| All railways..... | 3,491 | 32,186 | 8,781 | 5,632 | 9,785 | 14,025 | 1,484 | 7,800 | 4,281 | 11,846 | 2,941 | 102,252 |
| Total, all cars on line..... | 99,238 | 722,727 | 247,039 | 189,482 | 176,127 | 458,956 | 21,619 | 143,782 | 45,767 | 130,643 | 166,656 | 2,402,036 |
| Per cent of cars in shop..... | 8.31 | 7.66 | 12.31 | 10.04 | 10.25 | 6.16 | 6.60 | 11.46 | 9.08 | 6.98 | 5.00 | 8.35 |
| No. of freight engines owned..... | 1,435 | 10,880 | 3,090 | 3,472 | 2,928 | 7,395 | 502 | 2,924 | 858 | 2,942 | 2,617 | 39,043 |
| Average cars on line per freight engine owned..... | 69 | 66 | 80 | 55 | 60 | 62 | 43 | 49 | 53 | 44 | 64 | 62 |
| Total freight-car mileage..... | 56,472,285 | 492,503,421 | 141,857,842 | 156,435,210 | 139,854,977 | 303,925,712 | 24,888,424 | 97,326,790 | 35,325,963 | 121,152,779 | 106,657,462 | 1,676,400,865 |
| Average miles per car per day..... | 18.4 | 22.0 | 18.5 | 26.6 | 25.6 | 21.4 | 37.1 | 22.8 | 24.9 | 29.9 | 20.6 | 22.2 |
| Per cent loaded mileage..... | 72.2 | 64.6 | 63.7 | 61.5 | 65.6 | 69.6 | 75.9 | 67.1 | 65.3 | 71.0 | 73.5 | 68.0 |
| Ton-miles of freight, including company freight..... | 645,433,556 | 7,509,475,557 | 2,125,455,199 | 2,360,667,474 | 1,744,260,224 | 3,097,974,080 | 308,939,505 | 1,026,837,922 | 418,289,652 | 1,697,665,051 | 1,539,797,390 | 22,474,795,610 |
| Average ton-miles, including company freight: | | | | | | | | | | | | |
| Per car-mile..... | 11.4 | 15.2 | 15.0 | 15.1 | 12.5 | 13.2 | 12.4 | 13.2 | 11.8 | 14.2 | 14.4 | 14.2 |
| Per loaded car-mile..... | 15.8 | 23.6 | 23.6 | 24.6 | 19.0 | 18.1 | 16.4 | 18.1 | 18.1 | 19.7 | 19.7 | 21.2 |
| Per car per day..... | 210 | 335 | 279 | 402 | 320 | 281 | 461 | 289 | 295 | 424 | 298 | 320 |
| Gross freight earnings..... | \$7,189,037 | \$44,300,788 | \$11,800,592 | \$13,151,042 | \$11,871,052 | \$30,130,347 | \$2,732,852 | \$10,645,168 | \$3,512,914 | \$15,852,757 | \$10,803,013 | \$161,989,562 |
| Average daily earnings: Per car owned..... | \$2.60 | \$2.03 | \$1.84 | \$2.17 | \$2.17 | \$2.13 | \$4.33 | \$2.30 | \$3.55 | \$3.53 | \$1.92 | \$2.22 |
| Per railroad car on line..... | 2.42 | 2.07 | 1.60 | 2.31 | 2.30 | 2.18 | 4.38 | 2.53 | 2.73 | 3.18 | 2.13 | \$2.27 |
| All cars on line..... | 2.34 | 1.98 | 1.54 | 2.24 | 2.17 | 2.12 | 4.08 | 2.39 | 2.48 | 3.91 | 2.09 | 2.18 |

*Denotes deficiency.

The Chicago, Milwaukee & St. Paul announces the opening of its new transcontinental train service through Spokane, Wash., for September 14. On that date the main line passenger trains will discontinue the use of the 87 miles of the main line between Plummer and Marengo, Wash., and will be run through Spokane, the abandoned line being served with local trains. The company plans to put on a local train running between Seattle and Spokane, to be known as the "Cascadian." By the new arrangement the distance between Chicago and Seattle has been increased only fourteen miles. The time at both terminals will be the same as before. The service would have been begun several months ago but for the delay in the construction of the bridge at Spokane, which passes over the city bridge.

Increases in Passenger Fares

A general advance in mileage-ticket rates in the Eastern states was noticed last week, page 447. Some additional details are given by the New York State Public Service Commission, Second district, as follows:

On 500-mile books the rate is advanced from 2 cents to 2½ cents per mile by Boston & Albany, Boston & Maine, New York, New Haven & Hartford, and Rutland. The sale of 500-mile ticket books is discontinued by the New York Central & Hudson River and its leased line, the West Shore. Thousand mile ticket books are advanced from 2 cents to 2½ cents per mile by Boston & Albany, Boston & Maine, Buffalo, Rochester & Pittsburgh, Buffalo & Susquehanna, Delaware & Hudson, Lehigh Valley, New York, New Haven & Hartford, Rutland, and Pennsylvania. The sale of 1,000-mile ticket books is discontinued by the Central New England and Erie.

The New York Central & Hudson River continues sale of 1,000-mile ticket books at 2 cents per mile, but use is restricted to travel between points in New York state not interchangeable.

By all railroads the use of mileage tickets is practically confined to travel over their own lines of road.

In many instances limits of tickets are changed from "Good until used" to "One year from date of sale," and, except as to the Delaware & Hudson. On the Delaware & Hudson tickets sold prior to October 1, 1914, will only be honored to and including September 30, 1914, but the company will redeem unused coupons of such tickets at the rate of two cents per coupon.

All companies selling trunk line interchangeable 1,000-mile refund tickets have changed the regulations governing redemption value of cover of ticket from \$5 to \$2.50, which change has the effect of increasing the cost of travel from 2 cents to 2½ cents per mile. This form of ticket has not heretofore been good over the New York Central or the Lake Shore, but such tickets sold on and after October 1, 1914, will be good over those lines.

Car Balance and Performance

Arthur Hale, chairman of the committee on relations between railroads, of the American Railway Association, in presenting statistical bulletin No. 176, covering car balance and performance for May, 1914, says:

The miles per car per day were 22.2, compared with 23.0 for April. This figure for May, 1913, was 25.0.

Ton miles per car per day for May were 320, compared with 334 for April. This is a decrease of 17.3 per cent compared with the figure for May, 1913, which was 387.

The proportion of home cars on line was 68 per cent, compared with 64 per cent in April. This is an increase of 12 points over May, 1913.

The per cent of loaded car mileage increased from 60.2 per cent in April to 68.0 per cent in May. This figure for May, 1913, was 68.7 per cent.

The average earnings per car per day for all cars on line decreased 23 cents to \$2.18 in May. This figure for May, 1913, was \$2.55.

The accompanying table gives car balance and performance in the month covered by the report, and the diagram on the following page shows car earnings and car mileage and different car performance figures monthly from July, 1907.

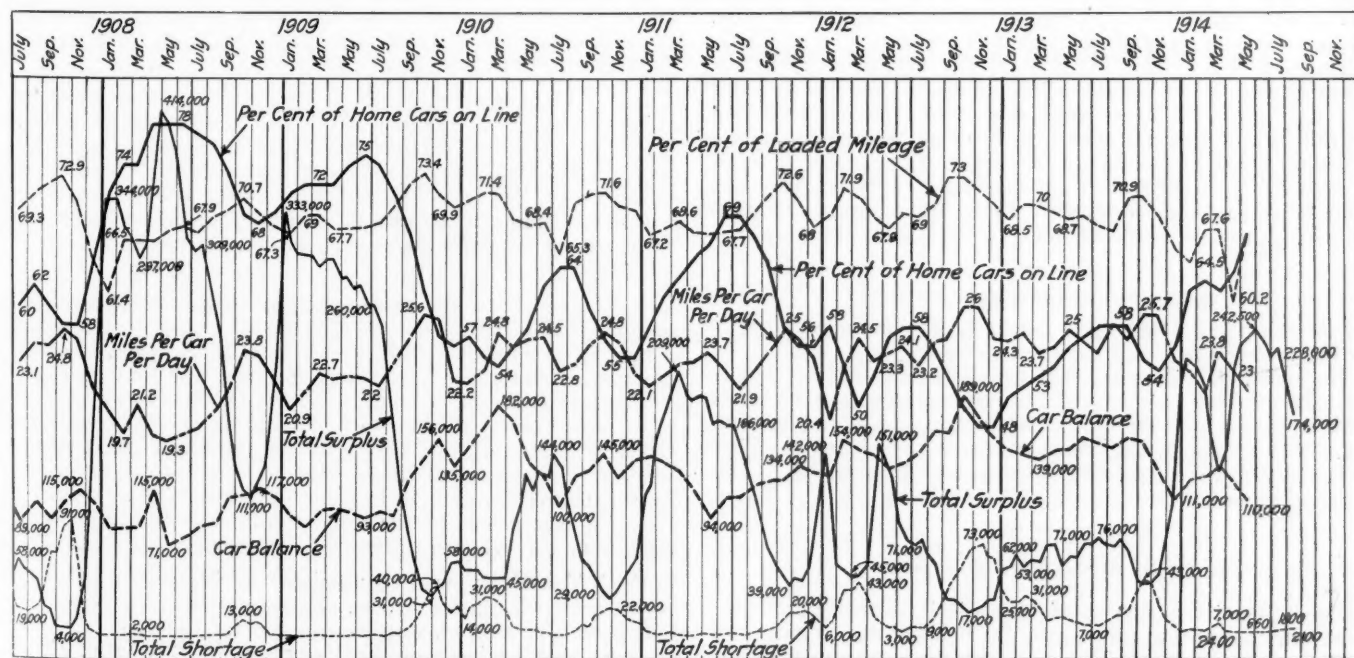
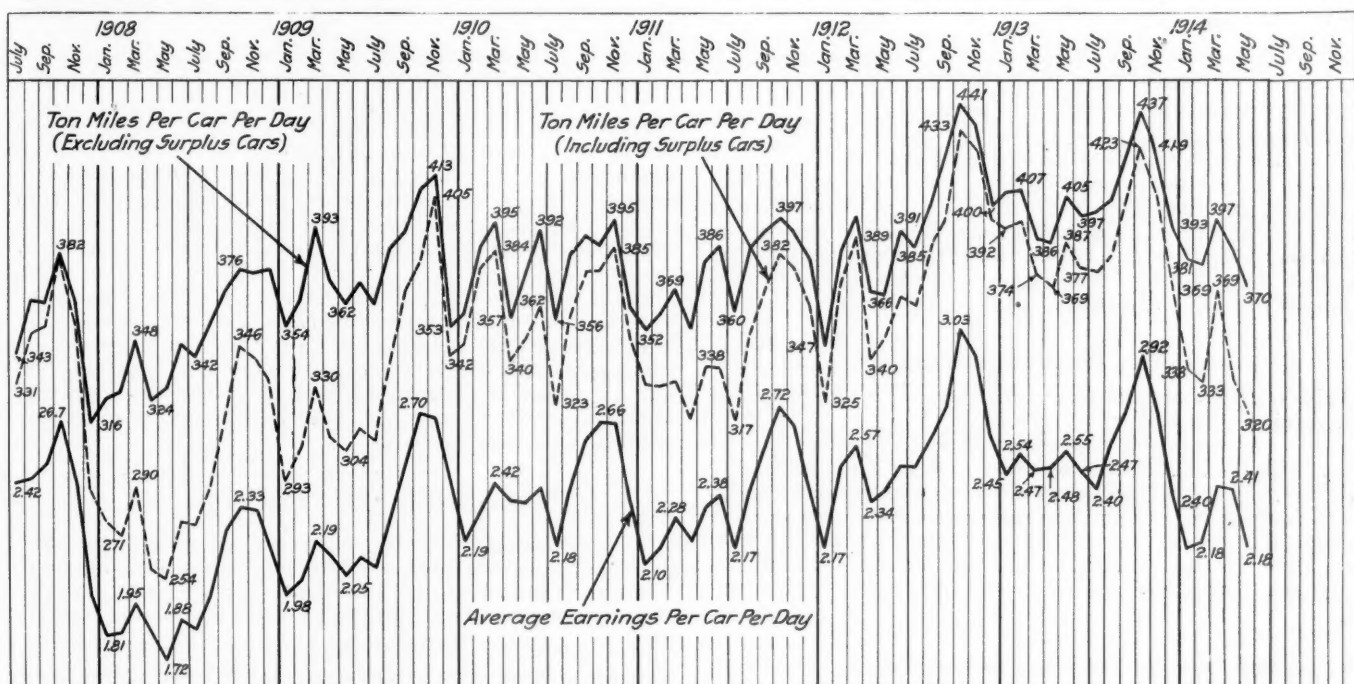
Car Location

The table on the following page, which was taken from bulletin No. 21 of the American Railway Association, gives a summary of freight car location by groups on August 1, 1914.

CAR LOCATION ON AUGUST 1, 1914

| | New England. | N.Y., N.J., Del., Md., Eastern Pa. | Ohio, Ind., Mich., Western Pa. | Va., W. Va., No. & So. Carolina. | Ky., Tenn., Miss., Ga., Fla. | Iowa, Ill., Wis., Minn. | Mont., Wyo., Neb., Dakotas. | Kans., Colo., Okla., Mo., Ark. | Texas, La., New Mexico. | Oregon, Idaho, Nev., Cal., Ariz. | Can- adian Lines. | Grand Total. |
|---------------------------------|-----------------|--|--------------------------------------|---|------------------------------------|----------------------------------|--------------------------------------|---|-------------------------------|---|-------------------------|-----------------|
| Total Cars Owned | 87,683 | 684,841 | 261,538 | 208,681 | 169,776 | 496,031 | 24,017 | 162,477 | 33,631 | 138,687 | 154,502 | 2,421,864 |
| Home Cars on Home Roads..... | 56,734 | 479,599 | 117,125 | 137,330 | 107,526 | 364,870 | 12,971 | 109,104 | 19,945 | 88,363 | 112,665 | 1,606,232 |
| Home Cars on Foreign Roads..... | 30,949 | 205,242 | 144,413 | 71,351 | 62,250 | 131,161 | 11,046 | 53,373 | 13,686 | 50,324 | 41,837 | 815,632 |
| Foreign Cars on Home Roads..... | 32,334 | 203,550 | 167,007 | 55,840 | 50,456 | 147,901 | 10,324 | 59,005 | 22,995 | 54,248 | 24,048 | 827,708 |
| Total Cars on Line..... | 89,068 | 683,149 | 284,132 | 193,170 | 157,982 | 512,771 | 23,295 | 168,109 | 42,940 | 142,611 | 136,713 | 2,433,940 |
| Excess or Deficiency..... | 1,385 | *1,692 | 22,594 | *15,511 | *11,794 | 16,740 | *722 | 5,632 | 9,309 | 3,924 | *17,789 | 12,076 |
| Surplus | 4,043 | 28,478 | 49,055 | 11,886 | 8,190 | 31,309 | 4,566 | 11,210 | 1,983 | 20,295 | 27,983 | 198,998 |
| Shortage | 14 | 6 | 629 | 50 | 258 | 681 | 50 | 375 | 54 | 216 | 0 | 2,333 |
| Shop Cars— | | | | | | | | | | | | |
| Home Cars in Home Shops..... | 8,157 | 61,178 | 23,718 | 20,304 | 17,843 | 37,819 | 859 | 15,850 | 3,678 | 6,683 | 6,747 | 202,836 |
| Foreign Cars in Home Shops..... | 477 | 5,103 | 7,295 | 951 | 1,367 | 4,069 | 569 | 1,700 | 913 | 3,336 | 172 | 25,952 |
| Total Cars in Shops..... | 8,634 | 66,281 | 31,013 | 21,255 | 19,210 | 42,963 | 1,428 | 17,550 | 4,591 | 10,019 | 6,919 | 229,863 |
| Per Cent to Total Cars Owned— | | | | | | | | | | | | |
| Home Cars on Home Roads..... | 64.70 | 70.03 | 44.78 | 65.81 | 63.33 | 73.56 | 54.01 | 67.15 | 59.31 | 63.71 | 72.92 | 66.32 |
| Total Cars on Line..... | 101.58 | 99.75 | 108.52 | 92.58 | 93.05 | 103.37 | 96.99 | 102.63 | 127.68 | 102.83 | 88.49 | 100.50 |
| Home Cars in Home Shops..... | 9.30 | 8.93 | 9.07 | 9.73 | 10.51 | 7.62 | 3.58 | 9.75 | 10.94 | 4.82 | 4.37 | 8.38 |
| Foreign Cars in Home Shops..... | .54 | .75 | 2.79 | .46 | .80 | .82 | 2.37 | .99 | 2.71 | 2.40 | .11 | 1.07 |
| Total Cars in Shops..... | 9.84 | 9.68 | 11.86 | 10.19 | 11.31 | 8.66 | 5.95 | 10.74 | 13.65 | 7.22 | 4.48 | 9.49 |

*Denotes deficiency.



Freight Car Mileage, Earnings and Performance, 1907 to 1914

Commission and Court News

INTERSTATE COMMERCE COMMISSION

The commission announces that its general investigation into complaints relative to embargoes on freight will be made the subject of a public hearing at Chicago, January 20, next. The investigation is in charge of Commissioner Daniels.

Switching Charges at Harrisburg, Pa.

Hooven, Owens, Rentschler Company v. Cincinnati, Hamilton & Dayton et al. Opinion by the commission:

The commission finds unreasonable a charge of 4 cents per 100 lb. charged by the Pennsylvania Railroad for switching service rendered at Harrisburg, Pa., and reparation is awarded to the extent of the amount collected over a charge of 2 cents per 100 lb. (31 I. C. C., 550.)

Switching Charges at Charlestown, W. Va.

Jefferson Milling Company v. Baltimore & Ohio. Opinion by the commission:

The commission finds that a charge of 4 cents per 100 lb. for switching cars loaded with flour from complainant's spur track on the line of the defendant at Charlestown, W. Va., to points on the Norfolk & Western, reached also by connections of the defendant, is unreasonable and that the switching charge on that competitive traffic should not exceed 2 cents per 100 lb., with a minimum charge of \$3 per car. (31 I. C. C., 547.)

Rates on Pulp Wood to Rhinelander, Wis.

Rhinelander Paper Company v. Minneapolis, St. Paul & Sault Ste. Marie. Opinion by the commission:

The commission upon rehearing reaffirms its former decision given in 26 I. C. C., 104, to the effect that the rate of 7.5 cents on pulp wood in carloads from Whitedale, Bovee, Christiansen Spur and Spur No. 447 to Rhinelander, Wis., was unreasonable to the extent that it exceeded 6.5 cents, and that the rate of 6 cents from Trenary, Delta Junction and Manistique to Rhinelander was not unreasonable nor discriminatory. (31 I. C. C., 555.)

Rates on Beer from the Twin Cities to Sioux Falls and Sioux City

In re beer and other malt products between stations in Iowa and South Dakota and points in Minnesota and Wisconsin. Opinion by Commissioner Harlan:

The commission finds that the carriers have justified a proposed increase in the carload rates on beer and other malt products from the special commodity rate of 15 cents per 100 lb. to the fifth-class rate of 20.1 cents from St. Paul, Minneapolis and La Crosse to Sioux Falls, of 20 cents from the same points of origin to Sioux City, of 20 cents from La Crosse to Pipestone, of 26 cents from La Crosse to Granite Falls, Minn., and of 18 cents from La Crosse to Marshall, Minn. (31 I. C. C., 544.)

Transit Privileges on Grain at Atlanta

Atlanta Milling Company v. Louisville & Nashville. Opinion by the commission:

The commission does not find that the failure of defendant to establish prior to May 16, 1909, a transit privilege under which grain could be forwarded from Cincinnati, Ohio, and Lexington, Ky., to Atlanta, Ga., there milled and reshipped to points in Carolina territory, resulted in damage to complainant. Complaint dismissed. (31 I. C. C., 485.)

STATE COMMISSIONS

The Railroad Commission of Mississippi on September 3 entered orders imposing fines on the St. Louis & San Francisco of \$500 for each of three failures to comply with orders of the commission requiring the construction of stations, freight houses,

etc.; and also one fine of \$500 against the Yazoo & Mississippi Valley.

The Railroad Commission of Texas has announced its adoption of the accounting methods and forms of the Interstate Commerce Commission. This will make a considerable saving for the Texas lines by saving them extra bookkeeping which has been required in the past to conform to the systems both of the interstate and state commissions.

Government Freight-Car Standards in Canada

The Board of Railway Commissioners for Canada, modifying its general order of February 17, 1913, respecting safety appliances on trains, has granted an extension of time until July 1, 1916, within which to make the following changes:

To change the location of brakes on all cars; to comply with the standard specifications prescribed in the regulations in respect of all brakes; to change cars having less than 10 in. end ladder clearance within 30 in. of the side of car; to comply with the standard prescribed in the regulations in respect to hand holds, running boards, ladders, sill steps, and brake staffs, except that when a car is shopped for work amounting practically to rebuilding body of car, it must then be equipped according to the prescribed standards regulations.

Railway companies are not to be required to make changes to secure additional end ladder clearance on cars that have 10 or more inches end ladder clearance within 30 inches of side of car, or to make the changes in end ladders, side ladders, hand grips and steps which have been made in accordance with the provisions of the general order above referred to, or to comply with the board's regulations aforesaid, until the car is shopped for work amounting to practically rebuilding body of car.

And it is further ordered that railway companies shall not be required to change the location of hand holds (except end hand holds under the end sills), ladders, sill steps, brake wheels, and brake staffs on freight train cars where the appliances are within 3 inches of the required location, except that when cars undergo regular repairs they must then be made to comply with the prescribed standards.

PERSONNEL OF COMMISSIONS

H. E. Kellenberger has been appointed as senior signal engineer of the central district, division of valuation, Interstate Commerce Commission, with headquarters at Chicago. He was formerly superintendent of signals on the Chicago Great Western.

J. A. Lindstrand has been appointed senior architect in the central district, division of valuation, Interstate Commerce Commission, with headquarters at Chicago. Mr. Lindstrand was for 15 years in the architect's office of the Chicago, Burlington & Quincy, and for the past eight years has been architect for the Chicago, Milwaukee & St. Paul.

Fred M. Baumgardner has been appointed as senior inspector of motive power in the central district, division of valuation, Interstate Commerce Commission, with headquarters at Chicago. His experience has been with the mechanical department of the Union Pacific and the Illinois Central, having served as roundhouse foreman, general foreman and master mechanic on the latter road and having recently been made master mechanic at Clinton, Ill.

D. K. van Ingen has been appointed second assistant field engineer in the central district, division of valuation, Interstate Commerce Commission, with headquarters at Chicago. He was educated at Rensselaer Polytechnic Institute, and has been with the Chicago & North Western, Choctaw, Oklahoma & Gulf and New York Central & Hudson River, having been assistant engineer in charge of valuation work on yards and terminals in Iowa on the Chicago & North Western since 1913, and within the last month having been appointed as chief draftsman in the valuation department of the same road. Mr. van Ingen is a member of the Western Society of Engineers.

W. E. Van Hook has been appointed to the position of office engineer for the central district, division of valuation, Interstate Commerce Commission, with headquarters at Chicago. He is a graduate civil engineer of the University of Wisconsin. The first five years after graduation he was on railroad work in lo-

cation, construction, maintenance and valuation work with the Chicago & North Western, the Chicago & Alton, and the Chicago, Milwaukee & Puget Sound. For the past three years he has been with the Illinois Railroad & Warehouse Commission, and later the Public Utilities Commission of the state of Illinois. He is a member of the Railway Signal Association.

W. A. Christian, formerly first assistant chief engineer of the Chicago Great Western, has been appointed by the Interstate Commerce Commission as senior civil engineer in charge of the



W. A. Christian

roadway and track department for the central district, division of valuation, with headquarters at Chicago. Mr. Christian graduated from the University of Cincinnati, and his early work was with the Baltimore & Ohio, Chesapeake & Ohio, and Cleveland, Cincinnati, Chicago & St. Louis. In 1894 he was assistant county engineer of Hamilton county, Ohio, and from 1895 to 1902 was with the United States Army Engineer Corps as assistant engineer in charge of plans and estimates for river and harbor improvements. He was then with the C. C. C. & St. L., for about a year on

maintenance work, and from 1903 to 1907 was again with the United States Army Engineer Corps as assistant engineer in charge of plans and estimates for concrete movable dams in the Ohio river. Since 1907 he has been with the Chicago Great Western as assistant chief engineer. He is a member of the American Society of Civil Engineers and of the American Railway Engineering Association, being chairman of the committee of records and accounts.

CANADIAN PACIFIC RESERVE MEN.—The Canadian Pacific has received a cable from Sir Thomas Shaughnessy, its president, to the effect that the positions of men who are called to the colors will be reserved for them, and that they will receive full pay for six months or for such shorter period as they may be serving their country.

PROPOSED RAILWAY ELECTRIFICATION IN SANTIAGO, CHILE.—The commission appointed to report on the proposed railway from Santiago to Valparaiso via Casa Blanca, has advised the construction of an electric line. The commission further proposes the construction of branch lines to Melipilla and Talagante. It is suggested that the former proposals for the electrification of the present steam railway system should be abandoned for the time, and that the \$11,500,000 intended for this undertaking be utilized in the construction of the proposed new line.

RAILWAY EXTENSION IN KOREA.—During the year 1913 133 miles of railway were opened in Korea. The total length of line now opened to traffic is, therefore, about 970 miles. The Honam Railway was completed in January, 1914, and the Seoul-Gensan line is expected to be finished in October or November next. During 1913 the Korean railways carried 4,143,803 passengers and 1,425,246 tons of freight, an increase, as compared with 1912, of 1,695,075 passengers and 293,474 tons of freight. No light railway was constructed in 1913. Starting from the financial year 1914-15, the third railway program is to be undertaken and will include the reconstruction of the Seoul-Fusan line, which was originally built in a hurry, owing to the exigencies of the time, and which, though since then to some extent improved, requires reduction in grades, etc. A line from Gensan to Yong-heung, 34 miles in length—a continuation of the Seoul-Gensan track—passing through Munchon and Kowon, is also to be laid down later, and the extension is expected to be carried on to Hamheung.

Railway Officers

Executive, Financial, Legal and Accounting

H. R. Kurrie, general attorney of the Chicago, Indianapolis & Louisville, has been elected president, with headquarters at Chicago succeeding F. A. Delano. A portrait and sketch of Mr. Kurrie appear elsewhere in this issue.

Operating

T. D. Stafford has been appointed assistant superintendent of the New Orleans, Texas & Mexico at DeQuincy, La., in place of H. S. Badgett, deceased.

Traffic

M. L. Schultz has been appointed commercial agent of the Detroit, Toledo & Ironton and the Georgia & Florida, with headquarters at Chicago.

C. W. Hay, traveling freight agent of the Louisville & Nashville, at Frankfort, Ky., has resigned, and the office of traveling freight agent at that place has been abolished.

Willis Callaway, Florida agent of the Atlanta, Birmingham & Atlantic, at Jacksonville, Fla., has been appointed commercial agent of the Norfolk & Western, with headquarters at Jacksonville.

Claude P. Wilson, commercial agent of the Missouri, Oklahoma & Gulf at Houston, Tex., has been appointed general agent at Dallas, Tex., succeeding F. S. Sleight, resigned on account of ill health.

Engineering and Rolling Stock

Gustave Gullickson has been appointed roadmaster of the Northern Pacific at Forsyth, Mont.

Charles Manley has been appointed master mechanic of the Missouri & North Arkansas, with office at Harrison, Ark., succeeding J. P. Dolan, resigned.

J. W. Barrie, principal assistant engineer of the Florida East Coast, with office at St. Augustine, Fla., has resigned, and his former position has been abolished.

William Schuman has been appointed general foreman of shops of the Chicago, Indianapolis & Louisville at Lafayette, Ind., in place of George Crumbo, resigned.

B. B. Kelliher, chief engineer of the Grand Trunk Pacific at Winnipeg, Man., has resigned on account of ill health, and H. A. Woods, assistant chief engineer at Montreal, Que., has assumed charge of the engineering department, with headquarters at Winnipeg.

W. S. Moseley, who has been appointed mechanical engineer of the Carolina, Clinchfield & Ohio, with headquarters at Erwin, Tenn., as has been announced in these columns, was born on March 5, 1880, at Bonsack, Va., and was educated in the public schools and at Virginia Polytechnic Institute, Blacksburg, Va. He began railway work as a messenger boy in the auditor's office of the Norfolk & Western, and from June, 1894, to January, 1899, was messenger and clerk in the same office. He was then for three years machinist apprentice in the Norfolk & Western shops and drawing office at Roanoke, Va., and from January, 1902, to January, 1909, was draftsman in the mechanical engineer's office of the same road, with the exception of two years, during which time he was an assistant shop instructor and special student at the Virginia Polytechnic Institute. In January, 1909, he was appointed mechanical draftsman of the Carolina, Clinchfield & Ohio, which position he held at the time of his recent appointment as mechanical engineer of the same road as above noted.

Purchasing

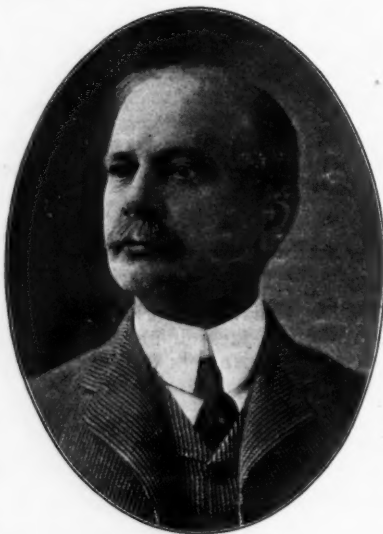
E. O. Griffin, general fuel and supply agent of the International & Great Northern, has been appointed purchasing agent for the receivers, with headquarters at Houston, Tex., and will report to Thornwell Fay, assistant to receivers.

OBITUARY

Paul P. Rainer, superintendent of the joint rate inspection bureau, with headquarters at Chicago, died at Brockville, Ont., on September 8.

Richard F. Stevens, formerly secretary and treasurer of the Camden & Amboy, now a part of the Pennsylvania Railroad, died recently at his home in South Orange, N. J., at the age of 82.

Frank Barr, formerly vice-president and general manager of the Boston & Maine, died recently at Winchester, Mass., at the age of 62. Mr. Barr was born at Nashua, N. H., and began railway work on March 1, 1869, as freight clerk and telegraph operator on the Worcester & Nashua, now a part of the Boston & Maine. From June, 1873, to November, 1892, he was general agent of the same road, and in November, 1892, was appointed superintendent of the Worcester, Nashua & Portland division of the Boston & Maine, at Nashua, N. H. He was promoted to assistant general manager in December, 1896, remaining in that position until July, 1903, when he was elected third vice-president and general manager of the same road, and in July, 1912, Mr. Barr was retired under the pension rules of the company.



Frank Barr

RAILWAY CONSTRUCTION IN BRITISH GUIANA.—In 1913 a project was seriously considered of constructing a hinterland railway into British Guiana which would undoubtedly have been of great advantage to the balata, timber and mining industries. The governor made a two months' tour of the interior of the colony, going to the Brazilian boundary, accompanied by a railway expert. At present there is a very earnest controversy over the advisability of constructing two railways immediately, one to be a considerable extension of the existing lines along the coastal districts and the other to run into the interior with possible connections with Brazilian points. A proposition was made to the secretary of state for the colonies for building these roads, but it was not favorably considered. The scheme has not been abandoned, but it is unlikely that actual construction will be undertaken for several years. At the present time a short extension of the existing railways along the coast is being built.

FRENCH RAILWAY EMPLOYEES.—Statistics recently issued by the French commission which is charged with the duty of supervising the work of railway employees show that in 1912 the total number of these was 171,240. These were divided as follows: Nord, 29,451; Est, 21,775; Orleans, 23,814; Paris, Lyons & Mediterranean, 40,090; Midi, 14,497; State Railways, 40,150; Ceinture, 1,463. Of the total number 11,799 were enginemen and 13,891 were firemen. Conductors and brakemen numbered 14,161, and there were 8,258 stationmasters and assistant stationmasters. Yard brakemen, switch tenders, etc., numbered 41,748 and the cleaners, car inspectors, etc., amounted to 4,139. Maintenance of way men numbered 42,406, crossing gate men 2,270 and signal men, etc., 3,194. There was also a number of miscellaneous employees. The Paris, Lyons & Mediterranean has more locomotives than any other railway in France and, as might have been expected, has therefore employed the largest number of enginemen, 2,302. On the other hand the Nord employed the largest number of firemen, its total being 3,429. The Paris, Lyons & Mediterranean employed the largest number of stationmasters and assistant stationmasters, 2,032, as well as of maintenance of way employees, 13,126.

Equipment and Supplies

CAR BUILDING

THE RUTLAND, reported in the *Railway Age Gazette* of September 4, as being in the market for 75 50-ton steel hopper cars, has ordered that equipment from the Standard Steel Car Company.

THE CINCINNATI, HAMILTON & DAYTON, reported in the *Railway Age Gazette* of September 4, as having ordered 1,000 box cars from the Standard Steel Car Company, has ordered that equipment from the Mt. Vernon Car Manufacturing Company, with the provision that the railroad has the right to cancel the order any time before October 1, 1914, provided that the receivers are unable to make satisfactory financial arrangements.

IMPROVING THE UGANDA RAILWAY OF BRITISH EAST AFRICA.—It has been proposed to relay the Airobi-Kisumu section of the Uganda railway with 80-lb. rails. The cost would be about \$13,300 per mile, exclusive of the strengthening of bridges, but it would permit the use of locomotives having three times the tractive effort of those at present in service.

FREE TRANSPORTATION FOR SOLDIERS IN LONDON.—The London street and underground railways and the London General Omnibus Company have announced that until further notice men in uniform, whether soldiers or sailors, will be permitted to ride free on all their lines whether or not in possession of the necessary government warrants.

GERMAN SOUTHWEST AFRICA RAILWAY.—It is reported that in 1913 no new railways were constructed in German Southwest Africa with the exception of a few private lines for mining purposes. The principal railway in the colony is the Otavi Railway, which, during the year ended March 31, 1913, had earnings of \$1,209,815. Its total expenditures were \$597,165, leaving a surplus of \$612,650. The total earnings of all the railways in the colony were \$2,107,705, and the total expenditures \$1,235,045.

FINANCIAL RETURNS OF THE CUBA RAILROAD.—The annual report of the Cuba railroad for the fiscal year ended June 30, 1914, shows that the company had gross earnings of \$5,164,671, as compared with but \$4,632,040 in 1913. The net earnings after deducting taxes were \$2,470,922 and interest charges were paid to the amount of \$819,417. There was paid in preferred dividends \$600,000, and a like amount in dividends on the common stock, so that the surplus for the year is \$316,505, comparing, however, with \$414,280 in 1913, when but \$1,000,000 in dividends was paid.

THE HAUENSTEIN TUNNEL OF SWITZERLAND.—At 10:40 a. m. on Friday, August 10, the Hauenstein tunnel on the Basle-Olten line in Switzerland, was pierced. The tunnel is 5 miles 94 yards in length, and was commenced on February 1, 1912. When completed it and its approach lines will replace the existing line between Sissach and Olten. On the latter line there is a tunnel 1 mile 968 yards in length, constructed in 1854-8. There is practically no difference between the lengths of the old and the new routes, but the new line will have much easier grades. On the old line there is a grade of 2.63 per cent for about 4 miles, and on this incline the tunnel is situated. The rest of the route has an average grade of about 2 per cent. On the new route the maximum grade will be 1 per cent, and in the tunnel the grade will be .75 per cent for about 4½ miles and .15 for the remaining distance. As a result of the improved grade wear and tear of rolling stock will be saved, economy of coal will be effected, and twenty minutes taken off the time of the journey between Basle and Olten. The contractors for the new tunnel were the Julius Berger Tiefbau Company, of Berlin, and the contract price was \$3,963,545. The tunnel has been pierced about eighteen months in advance of contract time.

Supply Trade News

W. H. Pratt, general superintendent of the North Works of the Illinois Steel Company, Chicago, died at his home Saturday afternoon, September 5, 1914. Funeral services were held on Tuesday, September 8.

Jay G. Coutant, formerly engineer of the plant of the Lima Locomotive Corporation, Lima, Ohio, has gone with the Railway Materials Company, Chicago, Ill., to specialize in the design of furnaces for burning powdered fuel and water gas, having done considerable experimenting in this work.

The Transportation Utilities Company, with general offices at 30 Church street, New York City, has opened a branch office at 1201 Virginia Railway & Power building, Richmond, Va. This office is in charge of Frank N. Grigg, and is devoted exclusively to the appliances manufactured by the Transportation Utilities Company.

The New Process Gear Corporation, Syracuse, N. Y., is building an addition to its plant, which was doubled in capacity less than two years ago and was at that time claimed to be the largest in the world devoted exclusively to gear making, and is planning to double the capacity of its casehardening and heat-treating departments.

The Gun-crete Company, Chicago, has acquired the interests of the Cement Gun Construction Company and has absorbed the construction department of the General Cement Gun Company. The combined business will be conducted under the name of the Cement Gun Construction Company, with office at Chicago. Carl Weber is president, John V. Schaefer, secretary and treasurer, and C. L. Dewey, construction manager.

TRADE PUBLICATIONS

SECOND HAND RAILWAY EQUIPMENT.—The Walter A. Zelnicker Supply Company, St. Louis, Mo., has recently issued bulletin No. 159, an 80 page booklet containing an illustrated and alphabetically arranged list of second hand railway equipment which may be bought from the company.

ENAMELED IRON SIGNS.—The Royal Enameling & Manufacturing Company, Chicago, has issued a catalogue of the Royal line of enameled iron signs. The booklet contains illustrations of a large number of typical signs, many of which are intended for use at railway stations, offices, shops, etc.

USEFUL SPANISH WORDS AND PHRASES.—This is the title of a 20 page booklet recently issued by the Joseph Dixon Crucible Company, Jersey City, N. J. The booklet, which is issued at a very opportune time, contains a large number of common English words and phrases with their Spanish equivalents, and has been compiled primarily for the use of tourists in the West Indies or South America.

TELEGRAPH POLES.—The Western Electric Company has recently issued a booklet entitled Western Electric Poles, describing in brief the obtaining of telegraph poles and containing the standard specifications of white cedar products established by the Northern White Cedar Association, several inspection comments, shipping data relating to northern cedar poles and in addition the official specifications of the Western Red Cedar Association.

SHEET METAL.—The American Rolling Mill Company, Middletown, Ohio, has recently issued two booklets descriptive of Armco Iron, entitled, respectively, "Defeating Rust, The Story of Armco Iron," and "Iron Roofs That Resist Rust." The former booklet is divided into chapters having such heads as: Armco Iron Has Historical Antecedents, Where Armco Iron Goes, What Scientists Say, What Engineers Say and What Users Say. Several illustrations are given showing the Armco Iron in various kinds of service. The latter booklet describes and illustrates the various Armco products.

Railway Construction

ALBERTA & GREAT WATERWAYS.—See Edmonton, Dunvegan & British Columbia.

ARKANSAS VALLEY INTERURBAN.—Arrangements have been made, it is said, to build an extension from Halstead, Kan., west via Burrton to Hutchinson, about 30 miles. The Hutchinson & Northern, a separate organization, is also planning to build from Hutchinson east to Burrton, about 15 miles, and may extend the line to Halstead.

ASHLEY, DREW & NORTHERN.—The final survey is now being made, it is said, for building a section of an extension north of Monticello, Ark. The projected route is via Gillett to Helena. (June 27, p. 1631.)

CANADIAN PACIFIC.—The Railway Commission of Canada has authorized this company to open a section of the Weyburn West branch from Shaunavon, Sask., west to Govanlock, 76.5 miles.

CENTRAL OF NEW JERSEY.—We are told that contracts have been let to the estate of Charles McDermott, Philadelphia, Pa., for the grading work and concrete abutments on the Easton & Western, a switching branch to be built from Glendon, a suburb of Easton, Pa., into the manufacturing district of Easton, about four miles. (April 3, p. 811.)

CHARLESTON, PARKERSBURG & NORTHERN.—An officer writes regarding the report that contracts are to be let to build a section of this line, that contracts will probably be let next spring. The plans call for building from Parkersburg, W. Va., south via Guthrie, to Charleston, about 75 miles. The cut and fill work will involve handling about 28,000 cu. yd. to the mile. The maximum grades will be 1.75 per cent, and the maximum curvature 9 deg. There will be five tunnels on the line varying in length from 800 ft. to 2,300 ft. The company expects to develop a traffic in coal, farm products and limestone. Henry H. Archer, president. Robert Cutler, chief engineer, Parkersburg. (April 24, p. 966.)

CHICAGO, BURLINGTON & QUINCY.—Track laying was recently finished, it is said, on the extension from Casper, Wyo., to Orin Junction. This completes the extension from Thermopolis, Wyo., via Powder River to Orin Junction. (July 10, p. 80.)

EASTON & WESTERN.—See Central of New Jersey.

EDMONTON, DUNVEGAN & BRITISH COLUMBIA.—Announcement is made that construction work will be continued on this line and the Alberta & Great Waterways railways, now building in northern Alberta. About 1,500 men and 475 teams are now at work. The Edmonton, Dunvegan & British Columbia has completed 70 per cent of the grade between Sawridge and Smoky river, 133 miles, and the line between Edmonton and Sawridge, 160 miles, has been completed. The Alberta & Great Waterways is being built by the provincial government between Edmonton, Alta., and Fort McMurray, 180 miles. Grading work has been finished on 95 miles, and track has been laid on 25 miles. (June 5, p. 1257.)

HUTCHINSON & NORTHERN.—See Arkansas Valley.

INDIANA ROADS (Electric).—Surveys have been made, it is said, for an electric line to be built from Boonville, Ind., north to Lynnville, and it is expected that work on the line will be started soon.

Surveys have been made, it is said, to build an electric line from Evansville, Ind., northwest to New Harmony, about 30 miles. Bonds are now being sold to secure funds for building the line which may eventually be extended north to Mt. Carmel, Ill., 35 miles additional, including a bridge over the Wabash river. Capitalists of Evansville are said to be back of the project.

MIDLAND PENNSYLVANIA.—A syndicate has been formed to take over the rights and property of this company, which was organized in 1910, to build from Millersville, Pa., on the Susquehanna river northeast via Sacramento and Gordon to Ash-

land on the Philadelphia & Reading, 44 miles. About 10 miles of the line have been partly completed. J. H. Williams, Pottstown, Pa., is secretary of the railroad company.

NEW ORLEANS, MOBILE & CHICAGO.—An officer writes that owing to financial conditions, it is doubtful whether actual construction work will be started in the near future on the proposed extension from Beaumont, Miss., south to a connection with the Louisville & Nashville at Ansley, about 80 miles. (March 13, p. 556.)

PENNSYLVANIA LINES WEST.—An officer writes that work is now under way on the Lengeloth branch, building from Burgettstown, Pa., to a coal section southwest of that place. The work includes putting up bridges at Burgettstown.

ROCK FALLS & SOUTHERN TRACTION.—Plans are being made, it is said, to build an electric line to connect Sterling, Ill., with Rock Falls, Tampico, New Bedford, Princeton and Kewanee, about 70 miles. A. S. Goodell, secretary, Rock Falls.

ROSSTON, GRAND RAPIDS & PROTECTION.—Organized in Oklahoma with headquarters at Doby Springs, to build from a point on the Wichita Falls & Northwestern at or near Rosston east to Doby Springs, 12 miles. L. A. Walton, president and general manager; J. H. Butler, secretary, and J. D. Scott, treasurer.

TEAL CREEK.—Incorporated in Oregon with \$10,000 capital to build a line from Falls City, Ore., to timberlands in Polk county. W. McCamant is an incorporator, Portland.

VAN HORN VALLEY.—Contracts have been given to E. G. Beecher and F. J. Cumming, it is said, to build from Van Horn, Tex., to a point in southeastern New Mexico, about 100 miles. The plans call for eventually extending the line further north, probably to Roswell. The incorporators include J. M. Daugherty, J. Y. Canon and J. Irby, all of Van Horn. (May 15, p. 1119.)

RAILWAY STRUCTURES

BALTIMORE, MD.—It is understood that the Western Maryland will soon start work on new piers and warehouses to increase its terminal facilities at South Baltimore.

BURGETTSTOWN, PA.—See Pennsylvania Lines West under railway construction.

BUTTE, MONT.—Work on the proposed new passenger station of the Chicago, Milwaukee & St. Paul, which has thus far consisted only of grading has been discontinued for an indefinite period.

CHICAGO, ILL.—Following a meeting of the directors of the Union Station Company on September 5, a statement was sent to the mayor asking an extension of time of one year for the acceptance of the ordinances providing for the construction of the new Union station, on account of the impossibility of financing the project at this time. The ordinances were to be accepted by September 23. The mayor has announced that he is in favor of the extension and that he will call a special meeting of the city council to consider it.

FT. WORTH, TEX.—The St. Louis Southwestern is building a new freight depot between Fifth and Sixth streets on Terry street. The structure is 34 ft. by 300 ft., and has a covered platform 140 ft. long. It is constructed of brick and concrete. The west end of the building will be two stories high and devoted to office space. A. W. Black & Sons, architects and contractors, St. Louis, Mo., are doing the work and expect to have it completed in four months.

NOBLESTOWN, PA.—The Pennsylvania Lines West are reconstructing bridge No. 22 at Noblestown, by putting a concrete slab top on the old masonry.

OIL CITY, LA.—The Kansas City Southern will erect a new passenger station. This structure is to be similar to the old station which was destroyed by fire on August 5, 1914. The approximate cost will be \$1,500.

WASHINGTON, D. C.—Plans are being made for putting up a concrete overhead highway viaduct over the tracks of the Philadelphia, Baltimore & Washington and the Baltimore & Ohio at Benning Road. The cost of the improvements will be about \$110,000, of which one-half is to be paid by the government and the other half by the railroads.

Railway Financial News

BELT RAILWAY OF CHICAGO.—This road, which is owned jointly by 11 railways, each of which holds \$240,000 of its \$2,640,000 capital stock, leases from the Chicago & Western Indiana the latter's Belt division on a 50 year lease from November 1, 1912, and also the equipment which it uses. In 1913 the Belt Railway's operating revenues were \$3,088,798, \$2,111,250 of which was for transfer and \$924,675 for local switching. The total operating expenses, on the other hand, were \$1,975,736, so that the net operating revenue was \$1,113,062, as compared to \$1,090,094 in 1912. Taxes paid amounted to \$118,105, operating income to \$1,001,363. The gross income was \$1,168,999, from which must be deducted rentals of \$953,170, leaving a net income of \$215,829. As dividends of \$86,400 were declared the surplus for the year was \$129,429.

The company's property investment is in the form of leasehold estate, rights and franchises, and has a value of \$1,200,000. On December 31, 1913, the working assets amounted to \$2,444,483, \$1,262,871 of which was cash and \$879,460 miscellaneous accounts receivable. As noted above the capital stock, which is all common, amounts to \$2,880,000. There are no bonds outstanding. The company on December 31 had working liabilities of \$545,404, of which \$480,848 was audited vouchers and wages unpaid. There was also a liability item of \$109,508 of taxes accrued. The surplus on December 31 was \$81,940.

BOSTON & MAINE.—The Hampden Railroad has begun suit against the Boston & Maine, in the Superior Court, at Springfield, claiming compensation for failure on the part of the Boston & Maine to carry out its agreement to take a lease of the Hampden road. Damages are claimed to the amount of \$4,000,000.

CANADIAN NORTHERN.—It is announced in Toronto (as coming from Sir William Mackenzie) that the financial blockade in the affairs of the Canadian Northern has been raised by good news from the London underwriters; and Sir William says that the completion of the transcontinental line can now be carried forward at full speed. Nearly ten thousand men are now at work on the undertaking. It was generally understood that the enactment of the British moratorium was sufficient to place the plans of the C. N. R. in anything but a happy condition; and it was expected that the company would have to fall back on the Dominion Government and ask for further special legislation. The London underwriters had completed the purchase of the company's issue of \$45,000,000 of Dominion-Government-guaranteed bonds and had sent to Canada the first instalment of cash. Just as the flotation was ready for the British market came the declaration of war. Investors were not in an investing mood and the London house was caught between two fires. Even when Lloyd George blanketed all contracts by his moratorium act, that did not relieve the underwriting concern from the legal loss of its first payment to the Canadian Northern, amounting to several millions. Only by carrying out the agreement could the initial payment be saved. The only explanation that Sir William Mackenzie would make of the ultimate solution achieved at the London end was that the underwriters had resources of their own. These resources, it is said, are probably insurance companies' funds, which would be available independently of the iron-clad policy of the banks.

CHICAGO, ROCK ISLAND & PACIFIC.—The Central Trust Company, trustee under the 4 per cent collateral trust bonds of the Chicago, Rock Island & Pacific Railroad Company, began foreclosure proceedings in the United States district court at New York on September 3, the company having defaulted on the interest due on May 1 on these bonds amounting to \$71,353,500. The collateral on which these bonds are issued is stock, for the same amount, of Chicago, Rock Island & Pacific Railway Company. The amount of interest in default on May 1 was \$1,420,060.

NEW YORK CENTRAL & HUDSON RIVER.—The 5 per cent notes of this company maturing on September 15 to the amount of \$5,000,000 have been extended for one year at 7 per cent interest.